

# The Canadian Medical Association Journal

Vol. XIV

TORONTO, MAY, 1924

No. 5

## PROBLEMS IN THE METABOLISM OF DIABETES

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THAT diabetes mellitus is a disorder of nutrition affecting carbohydrate metabolism alone has been the currently accepted explanation of its character ever since Willis, in 1667, drew the first clinical picture of the disease. The invariable presence of sugar in the urine associated with certain typical clinical symptoms could not, as the result of observation of the experience of the last two and a half centuries, have been otherwise interpreted, more especially as but little was known of the history and fate of sugar in the body before the middle of the last century when Claude Bernard established that it is present in the blood of the normal subject and that what is not oxidized to meet immediate needs is stored in the tissues as glycogen, a reserve form of carbohydrate which he was the first to discover. The fact that the "ketone bodies," aceto-acetic and  $\beta$ -oxybutyric acids and acetone, which are aliphatic in character, are present in the urine of diabetics, did not affect this view as before 1884 the occurrence of the two acids in diabetic urine was unknown and since that date their production has been explained as due to imperfect oxidation of sugar or to a greatly lessened capacity of the tissues to convert sugar into fat for storage, a conversion that is one of the demonstrated results of carbohydrate metabolism.

That there may be, indeed, no "far cry" from carbohydrates to fats in fundamental metabolism would superficially appear from the facts, well established, that the glucose de-

rived from glycogen in muscle at the moment of contraction is converted into lactic acid (hydroxypropionic acid) which is of the fatty series of acids and a "relative" of  $\beta$ -oxybutyric acid, and that after contraction ceases five-sixths of this acid is synthesized to be stored again as glycogen. The change from glucose to lactic acid does not, however, involve either oxidation or reduction of glucose, for, weight for weight, both have the same oxygen content while if the  $\beta$ -oxybutyric and aceto-acetic acids of diabetes are derived from glucose the latter must undergo reduction to this end, but if derived from the higher fatty acids, stearic, palmitic, and oleic, these latter must be partially oxidized and the very fact that their production in diabetes is associated with that of acetone indicates that the "ketone bodies" are formed from fats through an incomplete oxidation which does not obtain in the normal non-diabetic. There must, therefore, be in diabetes, a disorder in the metabolism of fats as well as in that of carbohydrates, a disorder to which is due the acidosis so distinctive of the disease.

Support, apparently in a marked degree, for the view that diabetes is a disorder in carbohydrate metabolism alone has been furnished in the results of the administration of insulin to diabetics and depancreatized animals. These results include the reduction of the high sugar content of the blood to the normal or below it, the disappearance of sugar and of the "ketone bodies" from the urine and the storage of

sugar as glycogen in the liver, even to the extent, occasionally, of twenty per cent. or more of the weight of the organ. There is also a reduction of the fat in the blood and liver from a high to a low, practically normal, level. This reduction and the disappearance of the "ketone bodies" are held, by those who endeavour to explain the action of insulin, as secondary phenomena, the restoration of the power to utilize sugar being the cardinal feature. The fats are thus a side issue in the carbohydrate metabolism, they "burn in the fire of the carbohydrates," a rhetorical phrase that allays the curiosity of the semi-initiated in the lore of the subject.

That a wider point of view is necessary to prepare for a solution of all the problems involved in diabetes must be clear from a full consideration, not only of certain *a priori* principles but also of all the facts of normal metabolism.

First of all it may be pointed out that the living laboratory, the living complex, works directly on the materials which are normally available, either to use these directly to supply the energy for its various manifestations or to store them for future use. It converts fat into glucose and glucose into fat and it can metabolize proteins to yield either or both. It must be conceived, therefore, as equipped to deal as directly with fats as with glucose. If it, in certain conditions, is incapable of dealing directly with glucose, as in diabetes, the living complex itself is disordered and its other activities are hampered. The direct action on fats must also be affected. It does not work in separate compartments with a carbohydrate furnace in one into which it casts the fats and without which the fats are not burnt. To hold otherwise is to postulate that the living complex itself is imperfectly adapted to do its work and that is hardly credible.

That the combustion of fats in the living complex is slower than that of glucose or less readily affected, is admitted. One gram of stearin, a typical fat, for complete oxidation to  $\text{CO}_2$  and  $\text{H}_2\text{O}$  requires 2.930 grams of oxygen or 2.748 times what is needed for one gram of glucose. Fats are, therefore, more slowly oxidizable than glucose, and, further, as they are much less readily diffusible they do not

penetrate as readily the living complex in which their oxidation must occur if it takes place at all. It is not at all improbable that their oxidation occurs only when they are, in at least a loose, chemical combination with the constituents of the complex. Gowland Hopkins has shown that when the tissues of muscle, liver, kidney and other organs are extracted many times with hot water, then with alcohol repeatedly, the pulverized residue, consisting almost wholly of proteins, when suspended in water in the presence of glutathione, an oxygen-carrying, sulphur-containing dipeptide which is found in all these tissues in their living state, takes up oxygen and yields carbon dioxide as if, though dead, it respired, as it must do in a more striking way when it is part of the living complex. It is in the tissue elements, in their basic complexes, therefore, probably only in the presence of some analogue of glutathione, that the oxidation of fats and glucose occurs.

It has yet to be shown that even in acute diabetes the power to oxidize glucose is completely lost. If it is, why are fats oxidized, though incompletely, when glucose, much more readily oxidizable, escapes, and when even the basic material of the living complex takes up oxygen and yields carbon dioxide? This question is a pertinent one in view of the announcement recently made by Best, Smith and Scott that insulin is present in the tissues of typically diabetic animals and that extracts of such tissues when injected into normal rabbits, and even into diabetic dogs, produced the typical insulin convulsions. The amount of insulin they extracted from such tissues was, on the average, more than half that obtainable from the same tissues of the normal animal, and they found fifteen units of insulin, at the end of eight weeks, in the blood of a diabetic dog to which no insulin had been given and which had not been kept on any regulated diet. Their comment is: "Obviously, the insulin must exist in diabetic tissues in a comparatively unavailable form." If so, why should the insulin extracted from the tissues of one diabetic dog produce the typical insulin convulsions when injected into another diabetic dog?

There are, then, problems to be solved before it can be conclusively determined that diabetes mellitus is, primarily or solely, a disorder of

carbohydrate metabolism and that the defective metabolism of fats obtaining in this disease is a purely secondary or adventitious phenomenon. Till then one can but explain as best one can, and otherwise than the current view permits, the occurrence of lipaemia in the diabetic. The amount of fat in diabetic blood exceeds sometimes very greatly that of the normal. Bloor found that the average amount of lipid, including lecithin and cholesterol, in the blood plasma of a large number of mild diabetics exceeded the average in a large number of normal cases by about 40 per cent. The blood is in some cases so rich in fat as to have a chocolate and even a cream colour, when the vessels appear as whitish cords. Frugoni and Marchetti recorded (1908) a case in which the blood contained as much as 25 per cent. of fat. None of this fat appears in the urine. If it did we should now have a history of the disease extending as far back as the time of Hippocrates, and there would not be to-day the vogue for the view that it is a disorder affecting only carbohydrate metabolism.\*

Accompanying the lipaemia and hyperglycaemia there is obesity in a very large proportion of the diabetics in elderly life. This is a subject on which there are numerous references in the literature of diabetes. The prevalence of obesity amongst Chinese and Japanese diabetics is remarkable, according to verbal reports from physicians in the missionary hospitals in those countries. More detailed information on this subject from India has been furnished by Professor D. McCay of the Medical College, Calcutta, who with his staff of the Physiological Department has investigated the incidence of diabetes amongst the natives of the eastern region. This disorder is excessively common there, especially in Bengal, Orissa, and Madras, and very much more prevalent among the sedentary, well-to-do classes than among the coolies and manual workers. Its extensive prevalence led a Bengali to say to one of the investigating staff that "a man is no gentleman if he does not pass sugar by the age of 40." It was noted that the Bengali gentleman who developed glycosuria was almost certain to

become obese while still young. In this connection the investigators remark: "How often have we seen students pass out from this college normal so far as the amount of adipose tissue present is concerned, yet in a few months or so return almost unrecognizable on account of the mass of fat accumulated." They found that the normal blood sugar content is high in the hard-working coolie, higher than in the European, but there is no glycosuria, not even a transient one, and there is no deposition of fat, all largely due to the fact that his diet is restricted, not more than his daily expenditure of energy requires, but in the fat indolent individuals the sugar content of the blood is higher still, that is, there is hyperglycaemia though there may be no glycosuria. This condition they regard as the preglycosuric stage of diabetes into which it will inevitably pass through overfeeding. Their observations led them to conclude that fat deposition goes concurrently with, and is due to hyperglycaemia and that so long as fat formation and deposition is maintained glycosuria does not obtain, but when the power of disposal of the fat is overtaxed, as it eventually tends to be, glycosuria begins and becomes permanent, and the patient begins to waste. In such cases acidosis may be absent or present only in a slight degree, the terminal coma is of uraemic origin and due to retention in the blood of waste nitrogenous products of a disordered protein metabolism, a coma that is not unknown in the west, and regarded by some (*e.g.* Marcel Labbé) as one which may occur in the most pronounced diabetic condition.

From this representation of the results of the investigation it is clear that Professor McCay holds the view that glycosuria in Hindoos is caused not so much by the failure of the oxidation of glucose in the tissues as by the loss of the power to convert the sugar in hypoglycaemia into fat. That something more is involved is shown by the fact that in Hindoo diabetics as a rule, acidosis is not common and this postulates that in the great majority of them the power to oxidize the fats, even to produce the "ketone bodies," is lost. He and his assistants attribute the loss of power over carbohydrates to damage of the pancreas in some way associated with a gastro-duodenitis.

\*The first reference to diabetes was made by Aretaeus (of uncertain date but not later than the time of Hadrian or earlier than that of Augustus) but the form he describes was probably *d. insipidus*.

There can be no question that over-feeding with carbohydrates and fats, in the physically inactive, does, in elderly life, lead to diabetes, which is very frequently associated with obesity. This suggests that the Islands of Langerhans may thus become overtaxed and ultimately fail to function, either partially or wholly. In young subjects, on the other hand, the disease, which usually appears in a severe form, may arise through the action, on the Islands, of toxins produced by special bacterial forms. Renshaw and Fairbrother claim to have isolated from the stools of diabetics an organism which they named *B. amyloclasticus intestinalis*, which splits up starch, forming B-oxybutyric and aceto-acetic acids, butyl alcohol and acetone, along with sugar, and that these abnormal products, when absorbed, result in disordering the glycogenic function of the liver. In view of what we now know about insulin this theory of the causation of diabetes will scarcely pass muster, but there must be a profoundly toxic affection of the Islands, if diabetes in children, even as young as nine months, is to be explained. Stengel found that it arose in a number of adults through, or as a result of, acute infections which, he holds, must be regarded as the cause of the pancreatic lesion involved. What a specific toxin may do in affecting one organ alone is illustrated in the liver in acute yellow atrophy.

To obtain solutions of all the problems involved in the metabolism of diabetes one must await results of more research on the exact chemical composition of insulin, and on its fundamental action in the living cells. It is considered to be a hormone, a chemical substance produced by one set of cells or organ in the body to stimulate activity in another set or organ. If it is, why is an insulin substance produced in the yeast cell? It would then be formed in one part of the cell to stimulate activity of another, but this involves a *reductio ad absurdum* of the view that it is a hormone. Harden and Young found that the yeast cell can only metabolize sugar when it is combined with phosphoric acid as hexose phosphate. In

this connection it may be pointed out that Winter and Smith found that when insulin is given to normal animals the reduction of sugar in the blood is accompanied by a fall in the content of inorganic phosphates of the blood. There results the suggestion that the phosphoric acid so lost is taken up in the tissues to form glucose phosphate, as in the yeast cell. It may possibly be found that this glucose phosphate is chemically linked to the material of the living complex by insulin before oxidation occurs and that this may be the true rôle of insulin.

There is also the question: How are the Islands of Langerhans made to secrete insulin? That they are made to do so follows from the exhaustion of them in the inactive individual overfed with carbohydrates and fats. Does the sugar of the blood directly furnish this stimulation or is a hormone derived from elsewhere the factor? The hydrochloric acid of the gastric juice, entering the duodenum, leads to the formation, in the mucosa of the duodenum, of secretin, the hormone that stimulates the pancreas to secrete, and, curiously, soaps in the duodenum promote the liberation of secretin also. The action of sugars in this respect has not been investigated. It may be that a hormone for the Islands is produced in the duodenal mucosa. It is of special interest in this connection that Dr. Charles Workman, a clinical pathologist of Glasgow, twenty-five years ago, found in nearly all the diabetics on which he made post-mortem examinations that there was a remarkable hypertrophy of the whole thickness of the duodenal mucosa. Why this hypertrophy and overactivity of that part of the intestine which forms secretin?

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SOME INDICATIONS FOR THE RADICAL MASTOID OPERATION  
IN OTITIS MEDIA PURULENTA CHRONICA\*

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IN discussing the more important indications for operation in chronic inflammatory disease of the middle ear and the mastoid process, it is of interest to note briefly the gradual progress made in developing this operation from the time of J. L. Petit, a great French surgeon, about the year 1750, to the generally accepted scientific principles of the present day.

In the year 1828, J. L. Petit cited nine cases in which he had performed an operation for disease of the mastoid bone. He was the first to advocate the opening of this process for the cure of purulent inflammation.

During the years that followed, the operation was misapplied to the cure of deafness, and as a result fell into disrepute. In fact it was not until the time of Schwartze, 1873, that systematic principles were laid down for the scientific operative procedure. This distinguished otologist recommended the opening of the antrum through the cortex in order to allow free irrigation of the middle ear.

Some sixteen years later, Küster read a paper before the German Surgical Society, giving due credit to Schwartze, but advocating more thorough surgical procedure in the following words:—"Open up the bone freely so that it can readily be scrutinized, to clear away all disease and so fully expose the source of suppuration that the pus is nowhere checked in its outflow." This is the principle on which the mastoid operation of the present day is conducted.

The method, devised and carried out for lowering the facial ridge, throwing the tympanum, antrum and mastoid into one large cavity, was first described by Zaufel in 1894. Stacké had also been working on this plan and had come to a similar conclusion at almost the same time. Stacké's book was published in 1897, but his

paper on the subject was written in 1889. These two surgeons had carried out their ideas each in his own way, and the credit for the final operation should therefore be equally shared.

Further advances in the study of chronic purulent inflammation of the ear, have led to a far more comprehensive understanding of the physiology of the internal ear and the study of neuro-otology, a subject with which the aurist should be familiar. This discussion is, however, beyond the scope of the present paper.

The definition of otitis media purulenta chronica must of necessity be somewhat vague. What is the chronic element in an inflammation of the middle ear or mastoid? It seems that the following three factors must be taken into consideration: First, the length of time the disease has been present; secondly, the extent of disease in the temporal bone, and lastly, the character of the bone affected. The latter factor must be taken into serious consideration since the valuable histological studies of Wittmaack have been presented. In this work the author has pointed out that sclerotic bone is formed as a result of a failure in the pneumatizing process which is the normal development of a temporal bone. This process may be interfered with by an inflammatory condition in the years of infancy or early childhood with the result that pneumatization is impaired or ceases and the mastoid process is therefore solid or sclerotic.

It should be borne in mind that all three factors are closely related. Thus, an inflammatory process may clear up even after some months if the general resistance be good and the local area of disease be given a reasonable chance to clear; as may be seen for instance, following the removal of any obstruction such as polypi, granulation tissue or cholesteatoma. An example of this type of obstruction was brought to our attention in a case quite recently

\*Read at annual meeting Ontario Medical Association, Windsor, June, 1923.

operated upon for acutely diseased mastoid of about two months' duration complicated by furunculosis of the external meatus. On opening the mastoid cavity free pus was found and cells broken down. A discharge continued from the canal for longer than the usual five or six day limit, and on examination, the canal was found to be half filled with a polypoid granulation tissue. On removal of this tissue the furuncle proved to be entirely healed, and the granulations had sprung from a small perforation in the tympanic membrane. The discharge from this ear rapidly ceased and gave no further trouble. In view of this and other cases, we cannot then set a time limit of three months as constituting the chronic process, even though polypoid tissue be present; nor, in fact, can any other limit of time, by itself, constitute a definition of this process. Each case must therefore be judged on its own merits.

The radical operation of to-day is performed first for the preservation of life and secondly for the cure of the diseased process. It is indicated when conservative treatment would fail owing to one or all of three conditions: (1) the extent of the disease; (2) the fact that an acute process has been grafted on an old one which did not speedily subside, and (3) that cholesteatoma is present.

Under the first heading this discussion deals with the recognition of diseased bone in the commoner conditions met with in any clinic. The character of the discharge is of a confirmatory importance in diagnosis. Its consistence may vary from thick creamy pus to thin ichorous and irritating fluid. At times it is mixed with much mucus and is consequently tenacious and blood stained, especially when granulations or polypi are present. Frequently it has a peculiarly offensive odour when secondary caries or necrosis exists. At times, it has a bluish colour imparted to it by the presence of the *bacillus pyocyaneus*. It may contain numbers of white glistening epithelial cells, acid fast squames when cholesteatomatous masses are present in the attic or tympanic antrum; and, in cases of caries of the surrounding bony walls may be mixed with spicules of disintegrating bone.

Attention should next be directed to the membrana tympani which will be found perforated in most cases, although the discharge

may come from a sinus in the external auditory meatus connecting with the mastoid cavity. The perforations in the tympanic membrane may be single or multiple. They may be situated in any part of the membrane, most usually in the lower segment. They may be peripheral or central and of varying shapes. When situated in Shrapnell's membrane it is associated with suppurating diseases in the recessus epitympanicus, and when in the posterior part of Shrapnell's membrane is said to be an indication of suppurative inflammation of the lining membrane of the tympanic antrum.

Further information may be gleaned as to the duration of the process by noting the margin of the perforation. If of long duration, it is thick, indurated, and has an irregular whitish outline. If of comparatively recent origin the edges present a fairly vascular, pinkish appearance. In rare cases the tympanic membrane and middle ear may show no active inflammatory process, the discharge escaping through fistulous tracts in the posterior-superior canal wall communicating with adjacent mastoid cells. Such a case was recently operated upon at the Toronto General Hospital; in this no active inflammatory process was present in the middle ear, but a constant discharge kept pouring from a small opening in the posterior canal wall and at operation was found to be connected with the mastoid cavity.

The next step in examination will now lead to a thorough investigation of the condition of the middle ear. Polypi may be present, springing from the mucosa covering the inner and inferior walls of the tympanic cavity, from the free borders of a perforation, from the mucosa surrounding the ossicles and from the epitympanic space. The polypi are of two types: (1) simple localized hypertrophies of the mucous membrane; (2) those originating in granulation tissue. To the latter class belong the larger proportion of aural polypi, many of which are associated with an underlying area of bone disease. The preponderance of certain structural elements, fibrous tissue, blood vessels, glands, etc., gives the particular polypus its own individuality.

The various kinds of granulomata springing from the mucous membrane of the middle ear tract are chiefly: (1) the simple, i.e. granula-

tions arising with pyogenic and non-pyogenic infection presenting a mass of vascular tissue either uncovered or covered with epithelium; (2) tuberculomata; (3) lupus granuloma; (4) syphilitic granulomata. Malignant polypi may also be found in the ears. It is not the purpose of this brief paper to deal with these more uncommon conditions arising in the region of the ear, and they are therefore merely mentioned before passing on to the clinical indications of underlying bone disease, the next line of defense after mucous membrane and periosteum have been involved in the chronic inflammatory process. In the mastoid region fistulous tracts may lead to the interior of the mastoid cells or from the posterior wall of the antrum into the groove for the sigmoid sinus. The surrounding bone is commonly discolored and softened. The bony walls of the aqueductus Fallopii are prone to be affected, leading to exposure of the facial nerve and consequent paralysis. In cases of attic suppuration, the outer wall of the recessus epitympanicus is frequently softened and eroded. The ossicles, more especially the malleus and incus, are frequently found to be carious. In tuberculous cases the disease may be very extensive and the whole interior of the mastoid process broken down. The inner wall of the middle ear is frequently implicated, leading to the exposure of the contents of the internal ear. The posterior wall of the external auditory meatus may become affected, in which case its cutaneous covering becomes swollen and infiltrated. The clinical indications of caries and necrosis are subjective and objective. Pain may be present and is of a deep, boring character. Loss of hearing may occur from involvement of the internal ear.

Vertigo and tinnitus are also frequent under similar circumstances. The main objective indication is the palpating by means of a probe, or the seeing of necrotic bone. The presence of exuberant granulation tissue of vascular character and showing a marked tendency to recurrence after removal is in itself strong presumptive evidence of an underlying carious bone. The accompanying discharge has also a peculiar offensive odour as a rule and may contain spicules of bone. If then conservative treatment has failed to eradicate the disease, operation is indicated.

The second of the commoner indications for operation is the presence of cholesteatoma. The term cholesteatoma is applied to the whole process of epidermization, supposedly growing into the middle ear and mastoid areas from the external canal wall or the tympanic membrane, associated with the formation of a mass of desquamated epithelial cells frequently mixed with a purulent discharge. It does not apply to the simple epidermization process, and is therefore not always easy to say that cholesteatoma exists merely because this epidermization has taken place in the middle ear and is leading into the antrum. Nor for the same reason, can it be positively stated that true cholesteatoma formation exists because of the usual findings of disintegrating epithelial cells, etc.

Sir William Milligan, who has made very valuable contributions to the present knowledge of otology, divides cholesteatoma into two classes, one in which it occurs as an encapsulated mass unattended by suppuration, and a second in which it is an accumulation of epidermal cells associated with changes resulting from purulent otitis media (its exact origin is still somewhat in doubt).

This introduces into the discussion a symptom of some importance. Has a case of cholesteatoma with dangerous internal ear or intracranial complications ever existed in which there was no discharge, or if there was discharge was it ever odourless? Cases are often reported, but this detail has been left out. If then there be present no signs of intracranial complications or of involvement of the internal ear; if there be no odour to the discharge or if no discharge be present; if the patient can be relied upon to carry out treatment and to report at once any disturbances in relation to the ear, are we justified in nonoperative treatment? This reasoning is not intended to apply in cases where there is reason to suppose a large amount of destruction has taken place, from even pressure atrophy alone; nor yet to the ordinary public clinic case in which co-operation between patient and surgeon is not always possible. It would apply rather to the type of case in which the hearing will be diminished by operation, and, to the case in which a small amount of epidermoid tissue is found in the epitympanum

and antrum, a class of case in which one does not feel assured by any means that pressure atrophy or a destruction of bone is dangerously progressive.

However, with this modification, the presence of cholesteatoma which has invaded the antrum and cannot be dislodged is undoubtedly an indication for operation.

The third and last indication for the radical mastoid operation may be briefly dealt with. The dangers of an acute process cannot be too seriously considered when grafted on the varying degrees of destruction resulting from a chronic purulent inflammation which I have endeavoured to indicate above. The natural questions then arise as to the most favourable time for operation. (1) Can the surgeon afford to wait until the more acute symptoms have subsided, or (2) must he operate at once for the safety of the patient?

There are two clinical indications on which to base one's decision; (1) any danger signs, and (2) the type of infection. Danger signs include, indications of meningeal irritation, headache, photophobia, tonic spasm such as affects the muscles at the nape of the neck, vomiting and many other of the well known symptoms of meningeal irritation. Important as a warning would be increasing signs of labyrinthine involvement such as impairment of hearing, vertigo, vomiting, nystagmus, and signs of involvement of the lateral sinus as indicated by the two cardinal symptoms of fluctuating temperature, chills and positive blood culture; the latter in particular in the absence of any other possible source of a septicæmia such as pneumonia, erysipelas, etc.

Lastly one must look for symptoms leading to a suspicion of extradural or brain abscess.

In the absence or rapid disappearance of these danger signs, it may be considered safe to allow the more acute inflammatory action to subside. The advantage gained is the limiting of the progress of invasion by an efficient wall of defence. If now the operation be carried out every use should be made of the natural barrier formed by the inflammatory process. It should be left undisturbed unless hiding a deep seated focus of infection. A case recently

operated upon at the Toronto General Hospital will perhaps illustrate this point.

A man aged sixty, complained of severe headache over the right side of the head and moderate discharge from the ear. He gave no previous history of ear trouble. On examination, the contents of the middle ear were found to be almost entirely destroyed and the inner wall lined by a thin layer of skin. No sign of inflammation was to be seen, nor discharge. It was the typical residual otitis media purulenta chronica. On further observation a small fistula was found in the posterior canal wall. A modified radical mastoidectomy was performed leaving the tympanum intact and the final result was highly satisfactory.

It is desirable, lastly, to lay emphasis on finding the type of infection with which one is dealing. This is of far more practical value, as a rule, than is generally believed. If the streptococcus be found in the discharge, the chances of cure without operation are much lessened and the danger of waiting much increased. If *streptococcus capsulatus* were found, it is considered a positive indication for operation at the New York Eye and Ear Infirmary. This infection gives rise to such an insidious process that clinical signs are ill marked and grave damage may occur without any danger signs having arisen. Much of this information can be obtained by examination of the discharge before operation. If, for example, the *streptococcus haemolyticus* be found on direct smear or after cultivation, it is quite reasonable to surmise that this coccus is responsible for the acute process. And it is undoubtedly of additional value in forming a judgment as to the prognosis in the case.

I trust, gentlemen, that this exposition of a subject which perhaps merits an occasional review has not been without interest from the frequency with which it is met in any otological clinic; it is nevertheless, a disease process which may, at any time, give rise to the most baffling complications.

#### REFERENCES

The following are among the authors referred to in the above article: Sir Charles A. Ballance, Sir William Milligan, Sir James Dundas-Grant, E. B. Dench, Kerrison, etc.



## MANAGEMENT OF TOXAEMIA IN THE LATER MONTHS OF PREGNANCY\*

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MUCH as the recent investigations and observations demand it, for me to attempt even a review of the various phases of the toxæmia of pregnancy would be impossible in the time at my disposal to-night. The title of this paper has been chosen with a view to limiting the field to be covered, but at the same time allowing a certain amount of latitude in placing before you a few of the practical points that appear to me of the greatest importance in a consideration of this very vital subject.

Of all the pitfalls that waylay the pregnant and parturient woman, next to puerperal sepsis, toxæmia claims the most victims. What does this mean? It means that one in every four maternal deaths is due to what our vital statistics call "Puerperal Albuminuria and Convulsions." To be more definite, in 1922 maternal deaths from this cause were approximately:—In Winnipeg, 6; in Manitoba, 19; in Canada outside of Quebec, 197; in U. S. A., 4,500. Nor is this all. Placing ten per cent. of still births, and infant mortality during the first four weeks, as due directly or indirectly to the same cause, which I am sure is a conservative estimate, this means that each year in the U. S. A. more than 20,000 stillbirths and deaths in early infancy, can be placed at the door of toxæmia of pregnancy alone. With these figures before us this subject surely demands our earnest thought and consideration.

The cause of toxæmia of pregnancy is not yet known, but it is generally conceded by investigators that definite toxins are produced from an unknown source or condition peculiar to pregnancy. Among the numerous theories advanced may be mentioned, foetal, placental, bacterial, metabolic, hepatic, renal and endo-

crin disfunction, the first two mentioned being the most popular at the present time.

To instigate and coordinate a successful treatment one must of necessity have a more or less definite mental picture of the pathological lesions resulting from the different stages of toxæmia, and it may be safely said that our knowledge of the pathology is on a much more settled basis than is our knowledge of the cause of this disease.

It would appear to me that toxins are thrown into the maternal blood stream from the foetus or placenta, and that the peripheral liver cells are probably the first to suffer. As this essentially non-inflammatory but degenerative lesion progresses in the liver, normal metabolism is not accomplished, with the result that abnormal end products are found in the blood stream. It is granted that as yet comparatively little is known regarding the activities and function of the liver, but it would appear that liver cells, while undergoing these degenerative changes, are further damaged by the burden thrown upon them of even the ordinary intake of food. If the toxæmia progresses, organs other than the liver show degenerative changes, *i.e.* kidneys, brain and lungs, etc. I cannot help but feel that the kidney changes are secondary to, and dependent upon those in the liver.

Until such time as the exact cause of toxæmia is known, and until the physiology of the liver is more thoroughly investigated, treatment whether preventive or active, must of necessity, be more or less empirical. However, with the aforementioned picture in mind our outline of management should bear some semblance of intelligence.

Prophylactic treatment is covered by careful prenatal management and care. It might be stated that of the more than eleven hundred

\*Read before the Winnipeg Medical Society, October 19, 1923.

patients treated in the prenatal clinic of the Winnipeg General Hospital since it was started, not one case has been allowed to reach the eclamptic state.

A patient presenting herself early in the second trimester should have a careful history taken, particular note being made of previous severe infections, scarlet fever, toxæmia in previous pregnancies, headaches, neuritis, nervousness, circulatory or genito-urinary changes.

Physical examination should cover all systems. The presence of septic foci in mouth or throat should be particularly noted, and appropriate advice and treatment given. Presence or absence of oedema should be noted, and enquiries made as to whether it is present on rising in the morning. The blood pressure should be taken and recorded, the urine should be examined, and the amount voided in twenty-four hours should be measured.

The patient should be given sufficient information regarding the physiology and pathology of pregnancy, so that the most intelligent cooperation may be secured. The physician must now be prepared to give advice regarding the hygienic rules of pregnancy. Special stress should be laid upon the necessity for fresh air, an active skin, daily free bowel movements, and a non-irritating diuresis by the use of quantities of water. Advice must be given regarding clothing, diet and exercise. Fatigue must be avoided. The immediate reporting of severe persistent headache, morning oedema, lessened output of urine, or general miserableness should be insisted upon. Until the end of the seventh month the patient should be seen at least every four weeks, the urine examined and the blood pressure taken. After the seventh month she should be seen every two weeks, and of course oftener if any symptoms have developed.

Before outlining the management of commencing toxæmia a few statements will be made, which in the opinion of the writer, have considerable bearing upon the necessary treatment. The blood pressure of the average normal pregnant woman would appear to be slightly lower than in the non-pregnant—110-115 m.m. systolic. In practically every case in which the symptom complex of toxæmia appears the blood pressure is raised and

continues to rise with increase of toxæmia. Having the monthly blood pressure record at hand, a raised reading should at once put the physician on the look-out for other clinical symptoms.

The presence of albumin in the urine is very important, but the percentage present cannot be taken to indicate the severity of the toxæmia. The urine output with the specific gravity is of more significance than the percentage of albumin. The urea content of the urine is of importance in toxæmia, while the blood urea and diastase content of the urine help us in distinguishing between a toxæmia of pregnancy and nephritis.

A patient developing a slight persistent headache, a feeling of heaviness or dullness with or without a faint trace of albumin in the urine, a rise in blood pressure to 140-95, would be advised to restrict her diet for a few days to milk, cereals, milk puddings, and to drink quantities of water, to remain in the house, to rest and keep warm. She should measure the amount of urine voided in twenty-four hours, and should take sufficient saline each morning to secure two or three free bowel evacuations daily. Any increase in the severity of symptoms should be reported at once. A specimen of urine should be ready on the third day, the blood pressure should be taken, and the general condition should be investigated. Very frequently these cases require no further active treatment than this little attention to the bowels and the restriction of the diet. However, a close watch should be kept on such a patient.

If, on the other hand, the general condition has not improved under this treatment, the blood pressure has reached 150-95, headache is still present, there is a slight decrease in the urine output, and probably slight oedema is present in the morning, the patient should be put to bed, water only is allowed for at least twenty-four hours, and salines continued. If possible a nurse should be in attendance. If this is not possible in the home the hospital is the only place for such a patient.

Two high hot colonic irrigations followed by a good sweating in warm dry blankets should be carried out daily. Urine should be tested and output recorded each day. The colonic

irrigations should involve the use of gallons of a two per cent. solution of bicarbonate of soda. As a rule a patient will commence to perspire during the irrigation, and this is augmented by the warm blankets, while the blood pressure is usually reduced 10-20 m.m.

With a systolic blood pressure which ordinarily was 115-120, rising to 150 plus in spite of treatment, with the appearance of definite oedema in the extremities or on the face, definite reduction of urine and marked increase in the amount of albumin, headache persisting, or any visionary disturbances, admittance to a modern hospital should be insisted upon, where a more strenuous treatment could be carried out. An estimation should be made of the blood urea and the urea contents of the urine, blood pressure readings should be made frequently, the fundi of the eyes should be examined, and the patient should at all times be under close observation.

If in spite of all treatment the general condition does not improve, as evidenced by an increase in the output of urine, a drop in the blood pressure and the development of headache and other nervous symptoms, a second opinion should be secured as to the advisability of terminating pregnancy. A systolic blood pressure of 170 m.m. in a primipara I consider requires prompt action.

We court disaster if we wait for the pre-eclamptic epigastric pain, restlessness, twitching, hypertension, disturbances of vision. A "margin of safety" must be maintained. The fact that pregnancy must be terminated with the least interference possible should not be lost sight of. From the time that bougies, bags, or packing are used, at least 36 hours must be allowed the primipara to empty the uterus. As will be pointed out later we can do nothing worse than use force in an effort to rapidly empty the uterus. The fact that toxic cases withstand infections very poorly should help us to choose the circumstances under which, and methods by which, pregnancy should be terminated. The least interference and manipulation necessary to terminate pregnancy would appear to be our best mode of procedure.

With the consideration of induction of labour may be taken up the question of the child. It is a well known fact that children born

even at term of markedly toxæmic mothers do poorly and often succumb. That a toxæmia is not limited to the mother is to me definitely proved by the following case, abstracts from the history of which are as follows:

Patient, Mrs. M.—, age 38, Gravida iii, expected date early in April, 1923; first seen in January, 1923. No features of great interest were noted at this time other than the fact of the increased size and height of the uterus for the period of gestation. A small vertex could be felt at the brim; blood pressure 122-70, urine negative.

On March 1st, patient had a blood pressure of 148-90, very faint trace of albumin in the urine, suspicion of puffiness of feet and ankles, no headache, but a feeling of discomfort and heaviness. Patient put at rest; milk and salines were given.

On March 11th I have these notes; blood pressure 160-100, albumin plus, feeling miserable, heavy feeling in head, definite oedema in legs, advised to enter hospital at once. Here, after six days of energetic treatment, close observation, and clinical tests, her condition was not considered to be improving as it should, so, following consultation, labour was induced by rupturing the membranes through an os which easily admitted two fingers. A presenting foot was brought down. Two hours later this baby was delivered as a breech without help. A second sac was ruptured and even more liquor amnii than the first sac was allowed to drain away slowly. Baby No. 2 was born as an O.L.A. with three or four pains. First baby weighed 6 pounds 11 ounces, second baby weighed 7 pounds 13¼ ounces. Mother and first baby progressed well—a month later mother's urine was clear and blood pressure normal.

Twelve hours after birth the second and larger baby suddenly died, and it is the post-mortem findings in this child which are to me most interesting. Abstracts from the findings are:

*Cranial Cavity.*—There was extreme congestion of the vessels in the lateral sides of the cerebral hemispheres. A slight haemorrhage was seen on the superior surface of the tentorium.

*The Lungs* were a purplish red and on microscopic section showed definite congestion, but no inflammatory signs.

*The Liver* was of normal size; its anterior surface showed several whitish spots about 2 m.m. in diameter. On section these extended into the liver substance. No

definite macroscopic change was seen in remainder of liver. Microscopic section, however, showed profound degenerative changes. The cytoplasm of the cells was profoundly degenerated, and in some instances clear areas surrounded the nuclei. A section stained with Scharlach R for fatty changes showed a very diffuse fatty degeneration dotted here and there.

*Section of Kidney* showed a definite degeneration of the convoluted tubules. A section stained for fat showed fat deposits in the cells.

These findings show a pathological picture almost identical with that found in a mother dying in the eclamptic state.

I am very firmly of the opinion that during the last four weeks of pregnancy a child has much greater prospect of survival after induction of labour than if an attempt is made to carry the markedly toxic mother to term. The chances of the mother reaching the eclamptic state and having permanent damage done to liver, kidney, brain, etc., are much lessened at the same time.

With these facts in mind our line of treatment in a case which has reached the 37th week of gestation seems to me to be clear cut. Between the 32nd and 37th weeks our management may be more difficult to decide upon, but the individual circumstances, severity of signs and symptoms must guide us. Before the 32nd week with a severe toxæmia which does not clear readily under energetic treatment the prospect of the child should not carry much weight in our prompt treatment of the mother.

#### *Eclamptic State*

For obvious reasons it is not my intention to spend much time on the management and treatment. Whatever our line of treatment is, let it be well thought out, thorough in detail, flexible but not subject to sudden antagonistic changes, and above all conservative.

Briefly the following are to me the essentials:

- (1) Patient in hospital in a quiet darkened room under constant observation.
- (2) Morphine and ether sufficient to control convulsions.
- (3) Gastric lavage with sodium bicarbonate solution until return is clear, leaving two ounces of magnesium sulphate in stomach.
- (4) Patient on her side.
- (5) Hot colonic irrigations with sodium bicarbonate 2%, followed by hot dry blankets, hot wet pack if necessary to start skin action.
- (6) Induce labour to be terminated naturally if possible.

Discretion must be used of course not to increase convulsive seizures by inopportune irritation of patient, i.e. before control is secured by morphine. Venesection may be considered for extreme hypertension. As for veratrum viride, without experience in the use of this drug I cannot pass judgment.

One can hardly pass over the treatment of eclampsia without referring to the most instructive compilation of the results of methods used in Great Britain as reported by Thos. Watts Eden in the autumn number of the *Journal of Obstetrics and Gynaecology of the British Empire* of 1922.

Among the very many points of interest brought out is the difference in maternal mortality in the Rotunda Hospital, Dublin, in Great Britain, and even in different parts of Great Britain. Undoubtedly the conservative routine method exacting in detail, of the Rotunda Hospital plays a large part in the results from Ireland, but one cannot help but feel that this method done in a hap-hazard way will give no better results than the average obtained in Great Britain during the period of time covered.

Mortality average from Ireland (200) 10.29%.

Mortality average from Great Britain (1800) 24%.

Many fatalities I am sure result after a conservative commencement, lack of courage to continue it, and a sudden change to rapid delivery. In this report sufficient stress has not been laid upon the value of the blood pressure readings in anticipating the onset of convulsions.

The net results of different lines of treatment are here shown.

#### Mild Cases:

|   |      |
|---|------|
| Natural, induction, conservative interference | 5.2% |
| Caesarean section                             | 9.8% |
| Accouchement force                            | 25 % |

#### Severe Cases:

|   |       |
|---|-------|
| Natural, induction, conservative interference | 26.3% |
| Caesarean section                             | 43.2% |
| Accouchement force                            | 60 %  |

In conclusion let me bring again to your attention the following points.

Careful prenatal attention will eliminate much of the toxæmia of pregnancy.

Toxæmia in the mother means toxæmia in the child.



In the last four weeks of pregnancy for the sake of both mother and child, rather than allow a severe toxic condition to continue, pregnancy should be terminated.

Eclampsia, if it does occur, as a rule is best treated by sedatives, elimination and termination of pregnancy by conservative methods.

Every expectant mother who engages a physician during the first half of her pregnancy has the right to demand that she will not be called upon to pass through the dangers of that degree of toxæmia known as eclampsia. About 70% of all eclamptics are primiparae.

The woman who in her first pregnancy does not follow advice given is indeed rare, and the cooperation of all patients depends almost entirely upon the attending physician. It would appear that eclampsia reflects discredit upon the profession, and implies carelessness in prenatal attention or error in obstetrical judgment on the part of the individual physician.

Each physician must be held responsible for his own patients, but the onus of the education of the public to the importance of prenatal care rests upon the profession as a whole.

## GLYCOSURIA IN PREGNANCY\*

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IT is generally recognized that glycosuria is a phenomenon frequently observed in pregnancy. The incidence, as noted by different authors, is variable. The most striking observations are those of Küstner who found glycosuria in all of twenty-one cases between the thirtieth and thirty-third week of pregnancy. The glycosuria is generally regarded as renal in origin, due to an undue permeability of the kidneys to sugar, and independent of hyperglycaemia. The patients continue in good health and do not develop subsequently other clinical signs and symptoms of diabetes mellitus.

The object of this communication is to record the blood sugar time curves obtained from twenty-four patients who presented themselves for observation. In the absence of other clinical and laboratory evidence suggestive of diabetes, such curves are of great diagnostic value. In the table below are recorded the data.

In fifteen of the twenty-four patients the glycosuria was transient. Though previously noted by the physician in charge of the patient, it was absent on the day of observation, prior

to the sugar tolerance test. In only one such case, No. 15, an hyperglycaemia was found in the post-absorptive state. The dose of glucose for the test varied with the individual circumstances. In case No. 15, because of the hyperglycaemia only 30 grammes of glucose were given. In the cases No. 16 and No. 24 frequent blood analyses were not practicable and the procedure adopted was as follows: The blood and urine specimens were obtained in the post-absorptive state and then the patient was allowed a liberal carbohydrate breakfast, containing approximately 75 grammes of carbohydrate. The blood and urine were collected again two hours after the meal. In the remainder of the cases, No. 1 to No. 14, the usual procedure was followed. The blood and urine were obtained before and ½, 1, 2, and 3 hours after the oral administration of 100 grammes of glucose.

Of the cases No. 1 to No. 15, where complete analyses were possible, four (No. 12, 13, 14, 15) showed definite evidence of diminished tolerance for glucose. The remainder (11 in number) strengthened the view as to the renal nature of this phenomenon. In the cases incompletely studied (No. 16 to No. 24) the results obtained are suggestive of a renal gly-

\*From the Department of Metabolism, Montreal General Hospital.

cosuria, but one must here be guarded. In the cases (No. 17, 19, 21, 22, 24) showing a glycosuria prior to the administration of glucose in the presence of a normal blood sugar a lowered threshold is obvious. In the others, though normal blood sugars are noted two hours after the meal, it is quite possible that the normal threshold level may have been exceeded during the interval.

per cent. showed lowered thresholds. The fact that in four cases definitely diminished tolerances for sugar were found, further emphasizes the accepted teaching that persons having glycosuria, should be regarded as diabetic and treated accordingly until proven otherwise.

The writer is indebted to Miss Althea Frith, for all the technical work involved in the study of these cases.

| Case No. | Week of Pregnancy | Blood Sugar Percent |                         |        |         |         | Urine Sugar |                         |        |         |         | Remarks           |
|----------|-------------------|---------------------|-------------------------|--------|---------|---------|-------------|-------------------------|--------|---------|---------|-------------------|
|          |                   | Before              | $\frac{1}{2}$ hr. after | 1 hour | 2 hours | 3 hours | Before      | $\frac{1}{2}$ hr. after | 1 hour | 2 hours | 3 hours |                   |
| 1        | 35                | .100                | .148                    | .132   | .076    | .064    | 0           | +                       | 0      | 0       | 0       | 100 grams glucose |
| 2        | 29                | .078                | .162                    | .094   | .100    | .116    | 0           | +                       | +      | +       | +       | "                 |
| 3        | 12                | .096                | .158                    | .143   | .126    | .100    | 0           | +                       | +      | +       | +       | "                 |
| 4        | 30                | .127                | .159                    | .096   | .100    | .074    | +           | +                       | +      | +       | +       | "                 |
| 5        | 30                | .072                | .152                    | .100   | .182    | .120    | 0           | +                       | +      | +       | 0       | "                 |
| 6        | 12                | .110                | .146                    | .087   | .095    | .100    | +           | +                       | +      | +       | +       | "                 |
| 7        | 28                | .068                | .164                    | .152   | .146    | .072    | 0           | +                       | +      | +       | 0       | "                 |
| 8        | 32                | .120                | .132                    | .081   | .076    | .121    | 0           | +                       | 0      | 0       | 0       | "                 |
| 9        | 33                | .120                | .136                    | .126   | .100    | .125    | +           | +                       | +      | +       | +       | "                 |
| 10       | 30                | .101                | .127                    | .157   | .089    | .100    | 0           | +                       | +      | +       | +       | "                 |
| 11       | 32                | .086                | .100                    | .162   | .095    | .100    | 0           | +                       | +      | +       | +       | "                 |
| 12       | 28                | .106                | .230                    | .226   | .219    | .200    | 0           | +                       | +      | +       | +       | "                 |
| 13       | 16                | .099                | .162                    | .213   | .178    | .154    | 0           | 0                       | +      | +       | +       | "                 |
| 14       | 19                | .128                | .179                    | .196   | .150    | ...     | 0           | +                       | +      | 0       | ..      | "                 |
| 15       | 17                | .167                | .242                    | .314   | .300    | .302    | +           | +                       | +      | +       | +       | 30 grams glucose  |
| 16       | 24                | .096                | ...                     | ...    | .132    | ...     | 0           | ..                      | ..     | +       | ..      | 75 g. COH meal    |
| 17       | 33                | .100                | ...                     | ...    | .109    | ...     | +           | ..                      | ..     | +       | ..      | "                 |
| 18       | 30                | .087                | ...                     | ...    | .126    | ...     | 0           | ..                      | ..     | +       | ..      | "                 |
| 19       | 24                | .120                | ...                     | ...    | .139    | ...     | +           | ..                      | ..     | +       | ..      | "                 |
| 20       | 24                | .111                | ...                     | ...    | .078    | ...     | 0           | ..                      | ..     | +       | ..      | "                 |
| 21       | 33                | .126                | ...                     | ...    | .138    | ...     | +           | ..                      | ..     | +       | ..      | "                 |
| 22       | 30                | .099                | ...                     | ...    | .122    | ...     | +           | ..                      | ..     | +       | ..      | "                 |
| 23       | 24                | .096                | ...                     | ...    | .122    | ...     | 0           | ..                      | ..     | +       | ..      | "                 |
| 24       | 31                | .100                | ...                     | ...    | .076    | ...     | +           | ..                      | ..     | +       | ..      | "                 |

Thus, of twenty-four cases of glycosuria found in pregnancy with absence of other clinical signs and symptoms suggestive of diabetes mellitus, sixteen or sixty-six and two-thirds

## REFERENCE

KÜSTNER, H., Die Bedeutung der weiblichen generationsorgane für den renalen diabetes, *Zentralbl. f. Gynak., Leipz.*, 1922, xlv, 1238.

**Effects of Treatment of Bone Lesions in Congenital Syphilis.**—Material consists of roentgenograms of the long bones of eighteen congenital syphilitic infants studied by George Fred Sutherland and James Herbert Mitchell, Chicago, nine had symptoms referable to bone disease, such as swelling of a joint of an arm or leg, tenderness of the shaft, pseudoparalysis of Parrot, or pain on handling. The usual course of treatment consisted of from six to eight weekly injections of neo-arsphenamin, intravenously or intramuscularly, in doses up to 0.15 gm., followed by eight to ten weekly intramuscular injections of mercuric salicylate in

oil, in doses of from one-fifth to one-third grain (0.013 to 0.02 gm.). This course was followed by a rest from treatment for from three to five weeks, and then the Wassermann test was made and the course was repeated. The symptoms of the bone lesions decreased after the first injection of neo-arsphenamin, and usually disappeared within a month. The pseudoparalysis, when of the true Parrot type, cleared up quickly; but when complicated by rickets, the recovery of normal use of the extremities was much slower. Under this treatment, the roentgen-ray changes show a return toward normal.—*Jour. Am. Med. Ass.*, Nov. 24, 1923

## THE PROGRESS OF MENTAL HYGIENE IN MANITOBA

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FOR some reason difficult to explain on any rational basis, the majority of people look upon the insane only as a burden on the community, and it is rarely that "the man on the street" can be persuaded to regard them as sick and diseased, with the result that the human sympathy so lavishly extended to patients in a general hospital, is seldom conveyed to the mentally afflicted. In years gone by their problems were usually solved at the stake, where thousands of unfortunate individuals, having strayed from the path of mental equanimity, were burned as practitioners of "witch-craft." Even to-day one questions if much real sympathy is shown for the mentally aberrant, and expenditures for the betterment of this unhappy class are grudgingly and unwillingly made. Governments naturally feel the strain of supplying funds to maintain the incurably insane, and it is a difficult problem to show that money can be saved by adopting a wise policy of prevention or early cure. It can be readily demonstrated that every chronically insane patient confined to an institution costs the government in the long run anywhere from five to six thousand dollars. It is, therefore, not a difficult problem to calculate the saving to be effected by dealing as intelligently with insanity as we do with diphtheria, smallpox or any other preventable disease.

As far back as 1910 a survey of our provincial institutions was made by the American Committee for Mental Hygiene. Needless to say it is just as well that the report made at that time received so little publicity. They described the treatment of the mentally diseased of this province as being little more than the provision of a row of benches where patients might sit in contemplation of their unfortunate position until released from bondage by the advent of the "reaper."

In 1918 a second survey was made by a Can-

adian Committee composed of Dr. C. M. Hincks and the late Dr. C. K. Clarke. One regrets to say that a perusal of their report does not give the impression that much progress had been made during the previous eight years. At *Brandon* they found the wards "dark and dismal with nothing to vary the monotony" of institutional life, and the care of seven hundred patients was in the hands of a superintendent whose duties were both medical and administrative. At *Selkirk* conditions were much the same, though with a smaller number of patients, a little more than merely custodial treatment was found possible. At this time the only method whereby a patient who was mentally ill could receive care of any kind was by being arrested on a warrant charging him with insanity, after which he was declared of unsound mind by a magistrate and committed to jail. Subsequently he was transferred to the asylum where a sympathetic comprehension of his difficulties was impossible owing to the inadequate medical and nursing staffs then in existence. What would have been the expression of public opinion if a man suffering, for example, from tuberculosis, was to be considered a criminal and made a prisoner for the treatment of his malady?

During this year the medical profession knowing of existing conditions, requested the Government to make some improvement in the treatment of the mentally diseased, but not until the latter months of the war, when conservation of man power became a thing of such vital importance, was any definite move made. The Department of Militia at this time made a report on our institutions which was sufficiently severe to stimulate immediate activity in the better treatment of mental disease. The final outcome was the construction of a psychopathic hospital and the appointment of a director whose duty it was to reorganize the whole system of care for the insane. The first thing

done was to change the name of institutions at Brandon and Selkirk from asylum to hospital. The former, although signifying sanctuary or place of refuge, had come to mean little more than a place of confinement or a home of lost hopes. The next move was to lessen the stigma associated with mental disease by eradicating the legal formality surrounding the method of admission. Patients may now be admitted in one of three ways (1) voluntary admission, the only requirement being a willingness to conform to hospital rules and regulations; (2) general admission for observation and treatment at the request of a physician or relative, and (3) the ordinary commitment on order of a magistrate, a method seldom necessary of employment at the present time.

The "raison d'être" of the psychopathic hospital is not merely to act as a clearing house for the provincial institutions, it is a hospital where a concentrated effort is made to search out, in each individual case, the causative factors—social, psychic or physical—which have been operative in producing a state of affairs resulting in the individual's inability to adjust himself to his particular environment. Since 1919 almost fifteen hundred cases have been studied and treated, with the result that approximately 65% each year have been returned to the community as cured or sufficiently improved to make it possible for them to "carry on" as reasonably useful members of society. One sees here also a very definite economic saving to the Province. During 1918, 360 patients were admitted to the so-called chronic institution at Selkirk, in 1919 their admissions were reduced to 150, meaning, that at least one out of every two patients that in previous years would have gone to that institution were returned to the community. This improved state of affairs has been due, in part, to adequate facilities for the investigation and correction of factors at work in each case, and, in part, to the encouragement it has given to getting mental cases under care early in the course of their disease. Under the old regime

admission to a mental hospital was the last thing to be considered. The desirable condition, of course, is that it should be the first thing thought of and this situation is, at least, being approached in Manitoba. Early care of mental disease is just as important as the treatment of tuberculosis in the incipient stage. With the increasing demand for accommodation for treatment of acute cases, reception units have been erected at Selkirk and Brandon. The former was opened during the past summer and the building at Brandon should be ready for occupation some time during the present year. A very definite line will be drawn between these and the older institutions and every effort will be made to keep up the standard of treatment necessary to diminish the numbers of incurably insane with which the province has previously had to deal.

Coincident with this improvement in the treatment of early cases, a more concentrated effort has been made to deal with the difficulties of the more advanced or so-called chronic cases. At Brandon one medical man has been replaced by four; the nursing staff has been increased; a training school has been established and nurses with a thorough general training have been added to the staff; an occupational department with two trained instructresses has been instituted and a fully equipped laboratory with a qualified technician is at the service of the medical staff. At Selkirk similar improvements have been made with the establishment of a staff sufficient to give each individual patient the amount and kind of attention he needs, that is to give him the best possible chance of recovery.

In this short dissertation I have made a brief outline of the advancement made in the treatment of the mentally diseased in Manitoba. One has, however, no hesitancy in saying that past expenditures have been entirely justified and that future history, we hope, will continue to place the Province of Manitoba in a premier position with regard to the problem of mental hygiene.



## INDICATIONS FOR TONSILLECTOMY WITH A CRITICISM OF THE OPERATION

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I MUST apologize for the hackneyed subject of this paper; but you will agree, that in subjecting a patient to the risks and inconvenience of an operation, it is only fair to the patient that the surgeon should have very definite lines on which to make his decision to operate, instead of the apparently indefinite and general grounds on which so many tonsillectomies are performed; for I can imagine no greater compliment can be paid to anyone than that which our patients pay us, when, on our advice, they lie down on an operating table and allow us to render them unconscious and do whatever we think fit.

Tonsillectomy is looked upon as a very trivial affair, as an operation adapted to the meanest surgical capacity, but anyone who has undertaken to dissect off a thin layer of septic adherent fibroid tonsil tissue, lying deeply in the tonsillar fossa, will bear me out that such an operation requires the utmost patience and considerable skill and experience to perform it without damaging the surrounding structures or leaving any part of the organ behind. One of the best throat surgeons in England, Mr. Herbert Tilley, emphasizes this when he says:—"The complete removal of tonsils is a difficult operation in which uniformly good results can only be obtained by constant practice, coupled with the assistance of a good anaesthetist. When performed by a master hand, the manipulations often appear to be of the simplest, and this has prompted many to attempt the operation, who have had few opportunities for mastering its technical details. The inevitable result has followed; the method itself has been abused because of the imperfect results or unhappy complications which have followed its performance by unskilled operators."

Before a patient is advised that an operation is necessary, there are three main points to be taken into consideration:—

(1) Are the tonsils causing interference with respiration, deglutition, or voice production?

(2) Are the tonsils interfering with the normal passage of air into and from the middle ear via the Eustachian tube, either by displacement of the palate or by direct obstruction?

(3) Are the tonsils a focus of infection?

As regards (1) are the tonsils causing obstruction to respiration, deglutition or voice production? the diagnosis is easily made, as in these cases it is the size of the tonsils rather than anything else that is the cause of the trouble.

As regards the second question as to whether the tonsils are interfering with the functions of the ear, the history of present or past otitis media, acute or chronic, and the presence of tonsils which are large enough to interfere with the passage of air into the Eustachian orifice, are an indication for the operation, especially if inflation of the middle ear improves the hearing. In this connection it might be mentioned, that, after all tonsillectomy operations it is well to run the finger round the Eustachian cushion, breaking down any adhesions from old adenoids. It is surprising how constantly these bands of adhesions are found, and how much relief the patients get from the freeing of the nasopharynx.

As regards (3) are the tonsils a focus of infection? This point can be cleared up by the history and course of the case, combined with a careful bacteriological examination of the tonsils.

Many pathogenic organisms have been found in the mouth and pharynx of apparently healthy individuals. Among these organisms are the various types of streptococcus, pneumococcus, staphylococcus, diphtheroids, the influenza bacillus, micrococcus catarrhalis and others; and it is of course obvious that these

organisms only await the lowering of the vitality of the individual to give rise to trouble.

The organism that occurs most frequently in pathogenic tonsils is the long chained streptococcus haemolyticus, and in my opinion, if this organism is found, the tonsils should always be removed.

The streptococcus viridans, from its well-known association with sub-acute bacterial endocarditis, myositis and other low grade inflammatory conditions, is also an organism whose presence in the tonsils calls for removal of those organs, whether there are pathological conditions present or not.

Diphtheroids are almost invariably found among the flora of the tonsils, but their pathological significance is not clear; though in this connection I might mention that I have seen a case of very severe vertigo in a man of 56 clear up when the teeth were removed, the septicity of the teeth being apparently due to the spirillum and fusiform bacillus together with large numbers of diphtheroids.

The method used to obtain bacteriological evidence from tonsils is to dry the surface of the tonsil and then to insert a sterile platinum loop or a sterile swab into the lacunae of the tonsil; from this loop or swab a smear or culture is made.

The decision as to operation after this investigation may be summed up as follows:—If an adult with local or general symptoms pointing to a focal infection has persistent tonsils and the bacteriological examination of these tonsils is positive, the tonsils should be enucleated. If, however, a repeated examination gives a negative result, it is very doubtful if a tonsillectomy will result in anything but disappointment to both patient and surgeon.

In the case of children, the presence of obstructive symptoms will usually decide the question; but it must be remembered that persistent enlargement of the cervical glands for more than two or three weeks, and particularly of the tonsillar node at the angle of the jaw, calls for complete removal of the tonsils; the danger here being tuberculosis. The tubercle bacillus has been found in 6-7% of hypertrophied tonsils; but this percentage is probably far too small, if all varieties of tonsils were taken into consideration.

In criticizing the operation, I am speaking of the operation of tonsillectomy or the complete removal of the tonsils by enucleation. Any other method of dealing with diseased or obstructing tonsils will not give the certain results that are called for, and I have for a good many years almost entirely discarded any other method. Various operations are from time to time brought forward; but in spite of the advantages claimed for them, they all fail, in that they do not give the certain 100% results that tonsillectomy will.

The operation should be preceded by some preparation. The teeth and mouth should be free from disease. I almost invariably give my adult patients four days' previous preparation, during which time they take either 15 grs. calcium lactate three times daily, or the tricalsol tablets put up by Hoerner, which contain calcium carbonate, calcium tribasic phosphate and magnesium carbonate. I also instruct them to increase the sugar and milk in their diet. This preparation reduces the coagulation period of the blood, and so minimises the liability of after-haemorrhage and prevents much of the troublesome oozing at the time of the operation. The most frequent form of after-haemorrhage takes place a few hours after operation, the tonsillar recess is filled with a greyish-black clot, arterial blood escaping from beneath it. This condition is due to imperfect coagulation of the blood; I have never seen it where a patient has had calcium salts before the operation.

If I am unable to have this previous preparation carried out, as in the case of a patient coming in from the country, I usually give 1 cc. of haemostatic serum before the patient leaves the operating room.

The adult patient is given 1-6 gr. morphine with 1-150 gr. atropine  $\frac{1}{2}$  hour before the operation.

With children this preparation is not so important.

For the anaesthetic, I prefer general anaesthesia under ether. As far as local anaesthesia is concerned, I have often questioned patients who have had tonsils enucleated under a local anaesthetic, both here and in other parts of the continent, and the great majority state that if they had to have their tonsils removed again, they would most certainly have a gen-

eral anaesthetic. From the operator's point of view, I am sure that with a competent anaesthetist, general anaesthesia is the more satisfactory method. I must emphasize *competent anaesthetist*, for I have taken out tonsils with many anaesthetists, and nothing is so exasperating as to try to enucleate tonsils in a patient who is continually gagging, pushing the instruments around with their tongue and trying to twist their head round on the table. It is just another phase of the attitude so many seem to adopt towards the operation, in thinking that anyone can operate or give an anaesthetic for tonsillectomy. I have no hesitation in saying that a moderate operator and a good anaesthetist can do better work than a good operator with a poor anaesthetist.

As for the operation itself, remember that by uniformly good results is meant nothing less than 100% of tonsils removed in one piece with the capsule intact, and no other structure damaged, and that in order to attain this, the operation must not be hurried. There is no possible reason, when performing an operation that will remove a source of trouble and benefit a patient for the rest of their days, hesitating to spend 5 or 10 minutes more to get a perfect result and prevent mutilation, and there is no excuse for the operator who prides himself on beating the clock.

Sir Berkeley Moynihan has well described this type of operator when he says:—"There are surgeons who operate on the canine principle of savage attack, and the biting and tearing of tissues are terrible to witness. These are they who operate with one eye on the clock, and who judge the beauty of any procedure by the fewness of the minutes it has taken to complete."

The worst example of this I ever saw was an operation performed by a local surgeon, who removed half the left tonsil, the left anterior pillar, the uvula and a strip of the soft palate, half the right tonsil and the posterior pillar, all in the space of three minutes. He gave himself great credit for the rapidity of his work; but he left his patient with a kidney-shaped opening at the back of her throat, and a permanent regurgitation of fluids through the nose. The only verdict permissible after tonsillectomy is "No tonsils, no damage."

The most satisfactory method of operating

is to seize the tonsil with a suitable forceps (I myself use straight ones), pull the tonsil inwards and forwards, so as to make it prominent through the anterior pillar and mucous membrane, make an incision into the supra-tonsillar fossa as close to the edge of the mucous membrane as possible, introduce a hook knife and cut round the mucous membrane at the edges of the anterior and posterior pillars. Then introduce the index finger into the supra-tonsillar fossa and dissect off the tonsil from the superior constrictor muscle. The capsule is, as a rule, easily felt and recognized, and the muscle fairly easily pushed off it; but it should be remembered that some of the fibres of the superior constrictor muscle are actually incorporated into the capsule about its centre, and that it may be necessary to cut through these with a sharp instrument to avoid tearing the capsule. This finger dissection should be carried out so as completely to free the tonsil from its bed, taking care that the pointed lower end of the tonsil is quite free. It is this pointed lower end of the tonsil that is so often left behind, and by its later hypertrophy gives rise to the so-called re-growth of the tonsil. This leaves nothing for the snare to cut through except the fibrous pedicle, which is made up by the blending of the capsule with the connective tissue by the side of the tongue.

A good many operators do a partial dissection, sometimes not even completely freeing the pillars, leaving the snare wire to do the major part of the dissection. This procedure is, I am sure, responsible in many cases for the mutilation of the pillars and superior constrictor muscle, a cause of haemorrhage at the time of operation and later deformity. Another advantage of complete dissection is that if the artery to the tonsil bleeds after being severed, it is easily picked up; whereas if it is cut in the substance of the muscle, it is much more difficult to arrest the haemorrhage.

The artery which supplies the tonsil arises from the plexus formed by the ascending palatine branch of the facial with the descending palatine branch of the internal maxillary, pierces the upper and deeper part of the tonsillar recess, runs down between the capsule and muscular aponeurosis for about 1-2 inch before it enters the tonsil. This part of the artery is easily seen and picked up. Pressure

for a few minutes with artery forceps will as a rule stop the bleeding, though of course any doubtful vessels should be tied.

Under no circumstances should the patient be allowed to go out of the operating room until all bleeding except capillary oozing has been checked. A few extra minutes spent in stopping haemorrhage are nothing when compared with the troubles and anxieties incident on a continued or secondary haemorrhage. This last point is one that should be most carefully noted, for I have seen patients sent out of operating rooms with a pair of haemostatic forceps hanging out of the corner of their mouths; a more unsurgical proceeding I can hardly imagine.

The pillars of the tonsils are the structures that are mostly frequently damaged during the operation, and I imagine this is due largely to ignorance of their anatomical structure and of their functions. In some cases I know this to be the fact, for I was told by one interne that he was on the service for three months before he knew what the pillars of the tonsils were, and by another that he had been told that the pillars did not matter as they were only mucous membrane structures.

The anterior pillar or glosso-palatine arch runs from the inferior surface of the soft palate to the side of the tongue, and is formed by the glosso-palatinus muscle with its mucous membrane covering. Its action is to pull up the root of the tongue and approximate the glosso-palatine arch to the median line, shutting off the cavity of the mouth from the cavity of the pharynx.

The posterior pillar or pharyngo-palatine arch is larger and projects more towards the median line than the glosso-palatine arch. It runs from the margin of the uvula to the side of the pharynx, and is formed by the projection of the pharyngo-palatinus muscle and its mucous membrane covering.

Two strips of muscle arise from the lower border of the cartilage of the Eustachian tube and unite with the pharyngo-palatinus. These strips of muscle form the salpingo-pharyngeus muscle, which in its action helps to open the Eustachian tube at its orifice.

The action of the pharyngo-palatinus muscle

is to pull the wall of the pharynx on its own side upward and towards the middle line.

In their general action, these muscles act as guy ropes to the soft palate, keeping it in position as well as influencing its movements, and injury to one or more of these muscles will interfere with the position and balanced movements of the soft palate, with consequent impairment of all the functions in which the soft palate takes part.

From this description you will understand the necessity for the most careful preservation of the pillars of the tonsils in this operation.

I said earlier in this paper that I had almost entirely discarded any operative treatment for tonsils other than tonsillectomy, and "almost" implies an exception. There is a class of patient for whom it may be at times advisable to resort to some other method of relieving the diseased or obstructing tonsils. I am referring to professional singers. There is no question that complete removal of tonsils may, and in many cases does, cause some alteration in the singing or speaking voice. Temporarily I think it always does, and sometimes that impairment of function may last for some considerable time, owing to the loss of tone and the necessity for re-adjustment of the muscles of the palate to their altered position.

Of this I always warn my patients, explaining the cause and advising them not to attempt to sing for two or three months. In professional singers this alteration may be a very serious matter. If, of course, the tonsils are septic and causing systemic trouble, the risks to the voice may be less than the risks to the individual by allowing the tonsils to remain; but in other cases, where the tonsils are obstructive without being diseased, it would be better to attempt to remove the redundant tissue without risking the traumatism and possible interference with palatal movements consequent on tonsillectomy. The methods most in use in these cases are morcellement, repeated puncture with the galvano-cautery, and possibly radium.

The after treatment consists in avoidance of any articles of diet that will injure the healing surfaces, and a sedative spray or gargle.



## REMARKS ON THE TREATMENT OF FRACTURES OF THE LEG\*

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IN this paper the writer disclaims any pretence of trying to bring forward original ideas. Rather, it is intended merely to reflect his opinions based on personal experience, and to emphasize a few points which are sometimes forgotten.

It is unfortunately true that a large proportion of fractures of the leg result unsatisfactorily. The history of prolonged weakness, pain, lameness and sense of inefficiency is only too common, while some degree of deformity and permanent disability occurs with sufficient frequency to justify the conclusion that either the difficulties of successful treatment are often insuperable, or the methods in common use are faulty or are, in numerous cases, unskillfully applied.

Leaving out of consideration, for the moment, the terrible compound fractures in which not only the bones are crushed and comminuted, but the soft parts so terribly mangled that some degree of permanent disability is inevitable and the patient may be considered fortunate in escaping amputation, there remain many slighter injuries where recovery is slow or imperfect, chiefly because the surgeon fails to grasp the importance of maintaining the normal alignment while the fracture is healing. It cannot be too strongly emphasized that in the lower extremity, and even more in the leg than in the thigh, even comparatively slight deviation from the normal alignment may spell prolonged disability or even permanent reduction of efficiency.

Throughout this paper it is taken for granted that good x-ray pictures are available. Admitting the fact that in certain districts it may be impossible to command good x-ray pictures, and therefore the practitioner must do the best he can without them, it remains a fact that to

treat fractures without x-ray aid is so blind and uncertain that in cities it is unjustifiable, and even in the country should never be attempted except under circumstances of extraordinary difficulty. Without x-ray pictures, taken in two different planes, and preferably stereoscopic, it is impossible for the surgeon to have that clear mental picture of the conditions present in the injured limb without which his efforts to adjust the fragments and hold them in proper relation cannot be carried out intelligently.

Wherever there are two parallel bones to deal with, as in the leg, it makes a vast difference whether one or both be fractured. In those cases where the fibula alone is broken the problem of successful treatment is comparatively simple. Plaster-of-Paris bandages evenly applied over generous padding is the most convenient dressing if the surgeon is sufficiently familiar with the use of plaster. The dressing should extend from above the knee to the toes, the foot being kept at a right angle, and the plaster can be so moulded while hardening as to correct any faulty alignment, provided the surgeon is a mechanic and has a clear mental picture of the appearance of the fractured bone.

The same remarks will apply to most transverse fractures of the tibia, if the break be above the lower third. I have seen an unrecognized spiral fracture of the tibia in a child recover with perfect function without any treatment except abstinence from weight-bearing, but such good luck is rare indeed. On the contrary it is often impossible to get the fragments of a spiral fracture into sufficiently good relation, and to hold them there, without open operation. Satisfactory extension is very difficult unless secured by a nail driven transversely through either the lower end of the tibia or the os calcis. Such a pin,

\*Read before the Winnipeg Medical Society, January 18th, 1921.

when used in connection with a Thomas splint, occasions the patient practically no discomfort and often gives the surgeon complete command of the situation. This method answered admirably in one case treated by the writer about a year ago, where the patient who had already lost one limb above the knee, had sustained a severe fracture of his remaining leg. The importance of securing a good result was obvious. The fragments were so comminuted as to preclude treatment by ordinary methods, but the plan just described enabled me to get an excellent end result with a minimum of anxiety.

While I have always been opposed to the routine treatment of fractures by open operation, the leg, especially in its lower part, is a field in which skilful operative treatment is often the only course to be relied upon if a bad result is to be avoided. It need hardly be said, however, that operation is not justifiable except by a skilled surgeon and in a surgical environment such as will make disaster from infection practically impossible. Operation may be comparatively simple or extremely difficult. In some cases, after exposure, adjustment by traction and manipulation will be quite easy. Very frequently it is necessary to introduce the tip of the periosteal elevator, or similar instrument, between the fragments, using this instrument as a lever to assist the adjustment. Quite often we must carefully dissect away or push aside muscular tissue which has become impaled or entangled with the fragments. This condition is found so frequently in operating on fractures that after seeing it repeatedly one ceases to wonder at the failure of many fractures to unite. In cases subjected to operation such mechanical aids as plates and screws, wire, kangaroo tendon, intra-medullary splints of bone, etc., are at times indispensable. There are undoubted advantages in doing without them, however, and personally I find it possible, in an increasingly large proportion of cases, to manage without using any form of internal fixation. If the irregular edges of the fragments can be firmly locked together and are skilfully held while the wound is being closed and the plaster applied, subsequent displacement to a serious degree is very unlikely; this is particu-

larly true of fractures which are approximately transverse. Should plates be required those made of beef-bone, with screws of the same material, as introduced by Dr. W. E. Gallie, are far preferable to metal plates and screws. Everyone knows how frequently metal plates require subsequent removal, but plates and screws of beef-bone are much less offensive to the tissues and often become completely incorporated with the fractured bone. A beef-bone plate and bone screws, properly applied to an oblique fracture of the tibia in its lower third will sometimes save the patient from subsequent permanent disability.

The use of metal plates and screws in compound fractures of the leg has been much debated. Personally I am strongly of the opinion that it is in some of these cases that plates find their most useful application. The ease with which the fragments can be perfectly controlled during the healing of the soft parts, and the comfort with which Carrell-Dakin treatment, or any kind of necessary dressings can be carried out without disturbing the fracture, must strongly appeal to anyone who contrasts this method with the cumbersome and inefficient substitutes so often employed. The danger of causing general infection or severe osteomyelitis is one which exists chiefly in the imagination of those who have had little or no experience with this application of bone plating. Combined with the "bipp" treatment advocated by Rutherford Morrison astonishing results are sometimes achieved, even in cases which are severely infected when first seen. It is of course necessary to realize that the plate is not expected to remain permanently in place. When healing is so far advanced that there is no longer danger of seriously disturbing the relation of the fragments, a plaster-of-Paris dressing, with a window to permit attention to the wound may take the place of the plate, which may often be removed painlessly, in the patient's bed, without giving an anaesthetic.

One of the commonest injuries to the leg is the well-known Pott's fracture. In the typical case the fibula is broken two or three inches above its lower end, and combined with this there is a fracture of the inner malleolus. In some cases, instead of the inner malleolus being

fractured, the internal lateral ligament is ruptured. The foot is displaced outward and backward. The real difficulty is to restore the inner malleolus to its normal position and to hold it there until union is complete. To effect this reduction of the small fragment by manipulation alone is difficult, and may be impossible, yet failure to accomplish this spells future disability, often of a very severe type.

The number of patients seen in an orthopaedic practice where deformity, pain and lameness have resulted from old Pott's fractures, is convincing evidence that this injury is potentially a very serious one, and that either the methods of treatment usually employed are inefficient, or are very imperfectly carried out.

Bearing in mind that the foot is displaced outward and backward, corrective manipulation must be applied in the reverse direction so as to restore the foot to its normal relation to the line of incident weight. Full restoration of the malleolar fragment is impossible without strong inversion of the foot. Seudder states that it is impossible to invert the foot too strongly. While this is not literally true, it is well to err on the side of extreme inversion. Even with the strongest possible inversion the appearance of over-correction need cause little anxiety, because most of the inversion takes place at the subastragaloid joint. In estimating the extent to which the foot must be drawn forward, we will be guided by the degree of projection of the heel, as compared with the uninjured side.

Even if the inner malleolus be restored almost perfectly to its proper place, bony union may be prevented by shreds of periosteum and fibrous tissue which have fallen between the fragments and cannot be gotten out of the way by any possible manipulative effort. I have seen this often enough, when operating, to make me feel that for me personally it is safer, in treating Pott's fractures, to raise a flap at the inner side of the foot; then after restoring the malleolus to its proper place, and making sure that no soft tissues are interposed, the fragments are drilled and accurately fastened together with heavy kangaroo tendon. One can then be sure that the risk of subsequent disability has been practically eliminated, for if the inner malleolus

be perfectly restored the fibula will, in most cases, largely take care of itself.

Even when thus treated by open operation the retentive dressing must be applied so as to hold the foot well inverted. While various methods of splinting can be used successfully, for my personal use nothing is as convenient and satisfactory as plaster-of-Paris, applied from above the knee to the toes. In addition to generous covering of the limb with bandages of sheet wadding, two pads of thick, soft felt should be used, one over the outer side of the foot and lower extremity of the fibula, and the other over the inner side of the lower third of the leg. It is at these points that pressure and counter pressure must be applied while the plaster is hardening; if at the same time the plaster be moulded carefully about the heel and other prominent bony points pressure sores will be avoided and the dressing will be comfortable to the patient. The foot should be held at approximately a right angle to the leg. Sir Robert Jones has pointed out that in a certain proportion of cases the x-ray shows a chip broken off the lower anterior edge of the tibia. In such a case, if the foot be allowed to assume the plantar-flexed position, this fragment is likely to prevent future satisfactory dorsal flexion, a difficulty which can only be overcome by subsequent operative removal of this fragment.

However treated, whether by manipulation or by open operation as described, too much emphasis cannot be laid on the necessity of prolonged retention before weight-bearing is allowed. The time required will usually be less in those cases where the inner malleolus has been accurately fastened in place, but in all cases the extent of bony union should be checked up by the x-ray appearance before weight-bearing is permitted.

It is small wonder that deformity and lameness often follow this fracture when one so frequently hears a history of removal of all protection and encouragement of weight-bearing in from four to six weeks. Such a course invites disaster. I have for years taught my students that the text-book teaching in regard to the time required for union of various bones is quite unreliable. A careful study of a series of fractures by x-ray pictures taken at inter-

vals of two weeks, and continued for several months, is all that is necessary to show that while the fracture may appear firm at the end of a few weeks, new bone formation at the site of injury is not mature for many months.

In an orthopaedic practice one has abundant opportunity to check up these x-ray appearances by direct observation. It is a frequent experience in my practice to have fracture cases come under my care because of deformity, which either has proved uncontrollable or has not been discovered until several weeks or months have elapsed. It is usually necessary to open up the injured region in order to correct the deformity, and in doing this one very frequently finds the callus porous, dark red in colour and so soft as to be more suggestive of wax than of bone. Such callus may be sufficiently infiltrated with lime salts to look fairly dense in an x-ray picture. If callus in this immature state be subjected to the strain of weight-bearing, it is almost certain to yield, with resulting deformity.

Sir Robert Jones has pointed out the useful clinical fact that callus which is tender on pressure is still immature, and will yield to either adverse or favourable mechanical influences.

Applying these facts to our management of Pott's fracture it is particularly necessary to afford mechanical protection for a lengthened period, because the anatomical relation of the foot to the leg is such that the body weight constantly tends to roll the foot over on to its inner border. If weight-bearing without protection be permitted while the callus is still soft and yielding the almost inevitable result will be recovery with a foot so far displaced outward in relation to the line of weight transmission as to be a source of pain and weakness for an indefinite period, and often permanently. I never allow a patient recovering from Pott's fracture to put weight on the limb for at least two months, and then usually with the sole and heel of the shoe thickened at its inner border so as to force the foot into an inverted position. In bad cases it is safer to give additional protection for several months by an outside iron attached to the shoe. A "T" strap sewn to the inner side of the shoe and buckled around this iron brace will effectually counteract any tendency to eversion of the foot.

In dealing with fractures of the leg which have not become firm, the first requisite is to distinguish clearly between delayed union and non-union. I have, on different occasions, had patients referred to me for operation on supposed ununited fractures, who required no treatment beyond time, patience and local stimulation of the fractured region.

While the scope of this paper does not permit a full discussion of the subject of delayed union, it may be said that if a mass of callus, tender on pressure, can be felt about the fractured region, there is hope of eventual sound union, even though movement can be detected long beyond the period usually required for firm repair. On the other hand, if the x-ray picture shows a clear space between the fragments after several months, persistence in conservative treatment may prove fruitless, because this clear interval often means a barrier of soft tissues interposed between the fragments, mechanically preventing bone formation.

The principles underlying the management of delayed union are so well known as to require no extended discussion. Mild functional use, under some mechanical protection that will prevent deformity or shortening, massage and percussion of the fractured limb and hyperemia produced by rubber bands above and below the fracture, as first advocated by Hugh Owen Thomas, are the most helpful measures at our command.

I have had occasion to operate on real ununited fractures sufficiently often to have reached the definite conclusion that the interposition of muscle or periosteum between the fragments is nearly always the cause of non-union. It follows that the thorough removal of this mechanical barrier to the constructive work of the osteoblasts is a fundamental factor in successful treatment. The soft tissues above and below the fracture should be separated from the bones no more than is necessary to permit thoroughness in our work. Aside from such freshening of the bone as is incidental to a thorough clearing away of all the interposed soft tissue and the exposure of raw bone surfaces, I find myself less and less disposed to resect the ends of the bones. In most cases extensive resection is unnecessary and may prove actually harmful by widening the gap between the fragments, which, in the case



of the tibia forces us to an equal resection of the fibula also.

In dealing with non-union in leg fractures our efforts should be concentrated upon the tibia. The fibula may be firmly united and demand osteotomy or resection to permit correction of the deformity of the limb, but so long as the fragments of this bone are even approximately in proper relation at the conclusion of our operation, it may be left to itself or dealt with subsequently, while we make every effort to bring about repair and normal alignment of the tibia.

Bone-grafting finds one of its most useful applications in dealing with ununited fractures, and nowhere can it be used to greater advantage than in a tibia which has failed to unite.

After the preliminary clearing away of interposed soft tissues and the correction of alignment, a properly performed bone-grafting will not only stimulate osteogenesis and shorten the time required for recovery, but will aid enormously in holding the fragments in good position.

The sliding bone-graft should be abolished, for two reasons: (a) It will not fit tightly in the trench prepared for it; (b) Bone taken from a tibia which has been a long time deprived of functional use is more or less atrophied and less likely to be actively osteogenetic than a graft from the opposite tibia.

The trench prepared for the graft should be about half an inch wide and should extend at least two or three inches into each fragment. Its boundaries should first be marked out with a twin saw and then cut out with a

single saw. Then the opposite tibia having been exposed, the distance between the two blades of the twin saw is slightly increased before using it to mark out the boundaries of the graft. Unless this be done the graft will not fit tightly because allowance must be made for the bone which is reduced to sawdust in the process of cutting out the graft.

Having marked out this slightly wider graft with the twin saw it is cut out with the single saw and then wedged tightly into the trench prepared to receive it. If well designed and of proper width it can be forced into place so tightly that not only will it stay in position without any kind of fastening, but it will form an excellent internal splint. Several additional wafer-like osteo-periosteal grafts, about an inch and a half in length, should be placed circumferentially about the fracture so as to have good contact with both fragments; these are held in position by suturing the muscles over them.

It is of the utmost importance that the limb be skilfully held by an intelligent assistant while the wound is being closed and the dressings and plaster applied, otherwise enough strain may easily be put upon the parts to loosen the graft and disturb the relation of the fragments.

As a rule the dressing is not disturbed in any way for about three weeks, at which time union is often well advanced, but plaster should be applied and worn for about six weeks longer, after which massage will favour recovery of function.

**Demonstration of Spontaneous Pneumoperitoneum by the Roentgen Ray**—In a group of 152 consecutive cases of peptic ulcer reported on by Glover H. Copher, St. Louis, 104 ulcers were duodenal and forty-eight were gastric. Two patients had both duodenal and gastric ulcers. Among the cases there were four acute and seven chronic perforating gastric ulcers, making a total of nineteen perforating peptic ulcers, or 12.5 per cent. of the total of 152 cases. Acute perforation of both types of ulcer occurred in 5.9 per cent. of the cases. A differential diagnosis between acute appendicitis and acute perforating ulcer was made in one case by the

demonstration of pneumoperitoneum. Pneumoperitoneum was demonstrated in a case, in which the patient gave a typical history and had typical symptoms and findings of a perforating peptic ulcer. A roentgenogram was made of the patient on his way to the operating room. At operation, a perforated duodenal ulcer was found; it was closed, and a posterior gastroenterostomy was made. The patient died five days later from lobar pneumonia and auricular fibrillation. A pyopneumoperitoneum from a subphrenic abscess was demonstrated in a third case.—*Jour. Am. Med. Ass.*, March 8, 1924.

## BLOOD TRANSFUSION—FACTORS FREQUENTLY OVERLOOKED

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THE performance of blood-transfusion has in a very few years, one might almost say over-night when we think of the age of medicine, become one of our most valuable life-saving procedures. The wide-spread publicity given to it by the press has educated the public to its virtues and it has almost become imperative that some member of the profession in each community be prepared to undertake this work. A perusal of the already large volume of literature on this subject reveals much that is of interest to the laboratory worker or the clinician versed in the technique of transfusion, but there is, nevertheless, a notable lack of instruction in those smaller, less obvious details which are really of paramount importance and which spell the difference between success and failure. It is with some of these questions that this communication will largely deal.

*Errors in Blood Grouping.*—To most physicians the problem of the preliminary blood grouping proves to be the biggest bugbear. The old method of washing corpuscles, incubating, etc., was indeed tedious, but the newer method of grouping with standard sera, types II and III, has made the agglutination test much easier. Its simplicity, however, must not be overrated and several precautions, not always observed, are necessary:

1.—There must be no possible mixing of the two type sera. If the serum be kept in test tubes, two wire loops should be used, labelled II and III and each reserved for its respective serum. They should be flamed each time to lessen bacterial contamination of the sera. A porcelain plate may be used for the two drops but coverslips are better. An excellent method is to mount two rubber ring washers on a glass slide and invert the coverslips over them, suspending the mixture of blood and type serum as a hanging drop. The loops should be flamed to redness and cooled before dipping into the drop of blood on the finger. This, of course, avoids contaminating

the second mixture (type III serum) with any II serum from the first loop used. All alcohol on the skin should have been fully evaporated.

2.—The mixture of type serum and blood must not be too dense; if it is, slight agglutination is not observed. A mixture which is just coloured gives the best results.

3.—The slide and coverslips should be agitated and dipped from side to side. Many times agglutination may not be visible until this has been done, whereupon it may become very marked. Also, after a time the corpuscles may settle to the concave bottom of the drop as an even sediment and too gentle agitation may only crack the layer here and there to give the appearance of agglutination. More active agitation, as with thin river ice, will break this layer up into a homogeneous suspension again, or produce real agglutination.

4.—One should wait fifteen minutes—by the watch—before making a decision. Agglutination is frequently delayed. We have observed strong agglutination thirty minutes later, but this is exceptional. One case was observed in another city where death occurred on the table. The testing was done very rapidly and the operator may have thereby missed an incompatibility, although the suddenness of the death resembled protein shock. To prevent the drying out of the drops, the slide should be kept in a cool place free from drafts, and the ring chamber should be sealed with a lubricant preparation. This enables longer observation before the slide dries than the "open slide" method.

5.—If no agglutination be seen macroscopically, the microscope should be used when possible. More than once, several observers have seen no gross clumping in the drop, yet the lens would reveal to us fine clumping throughout. Some writers feel that this can be disregarded. But supposing a patient is Group I Jansky (— —), the donor should be of the same group. The macroscopic exponents would

accept a donor, apparently Group I, whom the microscope might show to be a II (— +), III (+ —), or IV (+ +). This might give disastrous results. If the patient were a IV. Jansky, the testing of the donor would not be so important, since Group IV serum seldom agglutinates corpuscles of any group.

6.—In using the microscope, rouleaux formation must not be confused with agglutination. Most text books dismiss this phase with the one admonitory sentence and possibly an illustration. I have yet to see one illustration which accurately depicts the field as we see it through the microscope. Rouleaux are seldom, if ever, found in the even bank teller's rolls shown. A few are always squeezed out a bit to one side or the other. From these a fresh string may start giving a Y, K, or X formation or even more complicated groups. A hasty glance may decide these masses to be agglutination. One patient showed such excessive rouleaux formation that it could be detected macroscopically as fine granules. Without the microscope, I would have called the patient a "weak Four" instead of a "One" (Jansky). This might have proved unfortunate. The really difficult ones to group are those showing early and strong rouleaux formation with slow, mild agglutination following. As a rule, the deep reddish orange of the agglutinated groups differentiates them from the paler, less compact rouleaux masses.

Time permitting, it is advisable to do also the cross-agglutination test; i.e., matching the patient's serum and the donor's cells and also the patient's cells and the donor's serum. The first of these is the more important and, if negative, one can usually proceed with impunity. One important exception should be noted. Karsner has called attention to the fact that sometimes the agglutinative titre of the patient's serum may be so low as not to give clumping in the prescribed time, yet the bloods may be really antagonistic. Stock II and III sera of high titre would avoid this because corpuscles exhibit little variation in agglutinability. Also, in children the group characteristics of the cells are usually formed before the isoglutins and isohemolysins of the serum. Therefore the stock sera method of grouping which depends upon the cells of the blood tested is more reliable.

The direct testing is of most value in picking up the sub-group. Recently we decided not to use a certain donor after he and the patient had been taken to the operating room. The patient and the donor were in the same group as determined with type sera, yet the direct test showed clumping of the donor's cells by the patient's serum in twenty-five minutes. We have never observed this to be more than microscopic and doubt if it could cause death, although it might more than nullify the benefit of the transfusion.

When a patient is receiving repeated transfusions, or has not been grouped for some time, the bloods should be typed again before transfusing. This is especially true in children in whom the agglutinogens of the cells may not have been fully developed at the first transfusion. A few months ago, a child with aplastic anaemia changed from a Group II to a Group I. I also found a donor to be a IV who had been pronounced a III the week previous in another hospital noted for its accurate work. Even when repeated transfusions are being given from the same donor, test the patient each time. The stimulation from the first transfusion may have increased the production of isoagglutinins and agglutinogens in the recipient. Obviously, in these repeat cases, the cross-testing method would also be required, otherwise the effect of the increased isoagglutinins (and isohemolysins) of the serum would not be noted. De Biasi<sup>1</sup> of Harlem Hospital has shown recently that in haemorrhage of the new-born, the mother is a safe donor even though their groups be different. In such cases, mutual testing of the baby's cells and the mother's serum has shown no incompatibility in his series and practical experience has confirmed this observation.

*Citrate vs. Whole Blood.*—The choice of method has aroused considerable discussion. For ordinary haemorrhage cases, I do not think that there is much choice. The main thing is to get the blood in—and to get it in fast. On the other hand, in primary anaemia, in hemophilia, in sepsis and in all cases where opsonins and agglutinins are needed, the whole blood seems to be of more value than citrated blood. It has been shown that citrate reduces the opsonic and phagocytic powers of the blood, destroys complement and also the

platelets which are a strong factor in producing blood coagulation. These views have not been endorsed by all writers and further investigation, possibly of a laboratory nature, will be required to settle this problem. Clinical experience is dependent upon so many diverse factors that few observers can speak with authority especially when so many seem vitally interested in the success of their own methods. Only a long series of parallel cases can reduce the error produced by these other factors, such as individual resistance, virulence of infection and collateral treatment, to a minimum.

Most writers state that there are fewer reactions following whole blood transfusions. Lederer<sup>2</sup> in a parallel series reports 49.5% reactions in forty cases of citrate transfusion and no reactions in forty-nine unmodified blood transfusions. Brines<sup>3</sup> had reactions in 37% with the citrate method and in only 4% when using unmodified blood. Lindeman<sup>4</sup> reported 214 consecutive whole blood transfusions without a chill. The writer is more familiar with the whole blood methods, and in fifty cases I have seen only six reactions—two febrile reactions without chill, one urticaria and three chills—two very transient and one more severe, lasting forty-five minutes. This is certainly a much lower percentage than that usually claimed for the citrate administration. Different results are obtained by Lewisohn<sup>5</sup> who did the pioneer work in the citrate method. He reports 23% after the citrate method and 34% with the Unger method. Mellon has suggested that the hydrogen ion concentration of the citrate may be a factor. Certainly there seem to be fewer reactions if fresh and chemically pure solutions be used.

Another advantage of the whole blood method as usually practised is that the blood is not exposed to the air. It has been shown that sterile plates exposed on the instrument table of the operating room are invariably infected, usually with pathogenic organisms (Luckett and Maclean). We therefore can reasonably presume that all citrated blood is potentially infected by a few organisms during its collection. The citrate method is easier for the beginner and useful in severely shocked cases, but every worker should learn to use whole blood. The writer prefers the Unger stopcock method for adults and the multiple

syringe method for infants—in the latter group, following the technique elaborated by the late Bruce Robertson.

Many clinicians have found difficulty in manipulating the Unger and other whole blood machines and yet an analysis of the difficulties of several indicates a few fundamental errors:

1.—Failure to have everything ready before tapping the donor's blood stream. This includes adjusting the arms.

2.—Starting the blood flow *before* entering the recipient's vein and testing that entry with saline. In anaemic or stout patients this is usually the most difficult part of the operation.

3.—Connecting the apparatus to the donor's arm with an imperfect flow. A dribble will not suffice. There must be a solid column of blood pouring through the needle and this must be projected at least one inch. Insert the needle towards the hand and beware of valves in the vein.

4.—Needles of too small a bore. Use the largest available. The regulation Unger needles cannot be improved upon.

5.—Working too slowly. Whole blood must be kept moving. If a block occurs don't give up; disconnect from the donor and patient, rapidly flush the syringes and apparatus with saline and start again.

6.—Using tubing with a rough interior. Use high grade French catheters No. 17.

Contrary to some opinions the Unger machine can be used most successfully in the home. The technique is not necessarily as severe as practised in the operating room. For the home, an ironing board between the patient's bed and the donor's stretcher, some boiled or freshly ironed towels and a sterile saucepan for the saline constitute the preparation by the unskilled assistant, while the doctor boils his apparatus, needles and tourniquets. A liberal use of alcohol will offset any errors in the technique.

*Transfusing during an operation.*—When transfusing a patient during an operation, the objection to the presence of the donor can be overcome by using the patient's leg instead of the arm. The donor is placed on a stretcher at the foot of the table, the instrument is clamped to the table beside the ankle of the patient and the needle is inserted into the internal saphenous vein. The donor's arm is used. I have used



this site and the Unger apparatus for giving citrated blood during an operation, where the patient was liable to exhibit sudden severe haemorrhage; e.g., a nephrectomy or splenectomy. The citrate bottle is attached by a short length of tubing to the donor's side of the apparatus. The advantage is that the flow can be absolutely regulated to meet the requests of the surgeon or anaesthetist.

As a rule, I do not advise the giving of blood immediately prior to an operation unless especially indicated. This is because of the danger of a chill or other reaction which, added to the shock of operation, might prove too much for the patient. If possible, give after the operation, or, if the condition is very poor, give two hours before operating.

A word of warning may be permissible to those using the semi-direct methods. If care is not taken, it is possible that a donor might be infected from a septic case. This would occur by a back flow of blood through the instrument, due to the operator turning the stopcock or slide the wrong way or, in the case of the Unger machine, to the assistant carelessly pumping saline infected with the patient's blood into the donor. There is no excuse for such an accident. It is advisable to change gloves after entering patient's vein and before tapping the donor. If the patient has good veins, I have occasionally tapped the donor first, contrary to the usual practice.

The suggested preservation of the dried typing sera with suspended corpuscles for future reference in case of death from reaction, or possible forensic complications, does not appeal to us as being feasible. We have tried to read dried coverslips many times without

success. Of course, heavy agglutination can be easily discerned, but the finer changes,—the doubtful clumping—can seldom be accurately determined in the heavily checked film. And the coverslips or slides showing the borderline changes are the ones where the most errors are likely to occur. Staining the film is of some help.

In conclusion, one might add that there is a great need in practically all Canadian centres of some means of financing transfusions for indigent patients. Many of these poor people have no friends in their hour of need and no money to pay for a professional donor. New York City, for instance, pays twenty-five dollars to the donor for each city order transfusion and there is here in Canada an untrodden field for the consideration of philanthropists and benevolent organizations.

#### Summary

- 1.—Great care must be observed in the interpretation of blood grouping.
- 2.—Direct cross-agglutination is advisable but not always necessary.
- 3.—Whole blood given by one of the semi-direct methods is preferable to citrated blood.
- 4.—Ninety-five per cent. of failures to complete whole blood transfusion by the Unger method are due to the six basic errors cited.

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**Left Superior Cervical Sympathectomy under Local Anaesthesia in Angina Pectoris.**—In the case reported on by Jay Harvey Bacon, Peoria, Ill., there has been effected a complete relief from all severe symptoms. The results have justified the means used in this case, and Bacon regards the operation as a justifiable procedure in those severe cases of angina pec-

toris that do not respond to rest and diet and the administrations of nitrites. The incision over the anterior border of the sternocleidomastoid muscle gives a quick easy approach, and it may be safely attempted under local anaesthesia when the condition of the patient will not justify the use of a general anaesthesia. —*Jour. Am. Med. Ass.*, Dec. 29, 1923.

## PAROTID CALCULI

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THERE is a considerable amount of literature on salivary calculi, but so far as I can find, it appears that parotid calculi—*per se*—are exceedingly rare; certainly very few are reported.

In Osler's *Modern Medicine*, Vol. 5, page 73, it is stated:—"Stones may form in the ducts, rarely in the glands themselves, the most frequent being Wharton's duct, at a point from 10 to 20 mm. from the salivary caruncle. They seldom exceed the size of a pea, and are composed chiefly of calcium phosphate or calcium carbonate which constitutes 62 to 95 per cent. of the stone; they are usually single, but in the case of Brin there were four in one duct. Duct stones are cylindrical and smooth; gland stones usually rough and irregular."

Sajous's *Analytical Cyclopaedia of Practical Medicine*, Vol. 5, page 519, states:—"Salivary calculi sometimes form in the parotid gland and its duct, causing inflammation of the organ, retention of saliva, with enlargement of the organ." Nothing more of special significance is added.

Pearce Gould in *Elements of Surgical Diagnosis* (5th edition) discharges his reference to them with:—"A foreign body or a salivary calculus may be seen or felt in the orifice of Stensen's duct or pus may be seen flowing from it."

A large number of special works have been consulted, including Phillips on Nose and Throat, and Burnett's System, Nose, Throat and Ear; and a number of my colleagues have been interviewed; some have been good enough to review their libraries, and with the exception of the man who gave the anaesthetic in this case, none had seen such a case. I reviewed many issues of the *Annals of Surgery*; *Surgery, Gynaecology and Obstetrics*; many years of the *International Clinics* and that greatest of all reference system, the *Twentieth Century Practice*, and even here I find nothing dealing with calculi of parotid origin, nor indeed to calculi of Stensen's duct.

It is therefore evident that few cases have been seen, or at least, if seen, they have not been reported. It is therefore thought that the following report covering a case of parotid calculi will be acceptable:

Private Case. Mr. A., admitted February 13th, 1922, to the Victoria Hospital, Fredericton. Male, aged 23; good physique and family history; never had any of the usual diseases of childhood; weight 160 pounds; excellent teeth; all viscera—except parts involved—apparently normal. I had seen this case 12 years previously while called to his home to see another member of the family, and I suggested the removal of the tumour at that time, but was not again consulted until this day. The tumour was at the angle of the left jaw and about the size of a hen's egg, its walls merging into contiguous muscle; bimanual palpation elicited a deep semicystic mass and manipulation on deep pressure evidenced the presence of hard movable bodies, crepitation being to some extent noticeable. He had enormous tonsils, and correspondingly large adenoids—one could hardly reconcile such good physical development with such mechanical obstruction in the nasopharynx, the only symptoms complained of being paroxysmal vomiting. Ten years previously he had an attack of quinsy which recurred the following year. I do not recall the condition of his throat when first casually seen.

The tumour was approached from the outside, the incision coinciding with the skin folds, being exactly  $1\frac{3}{4}$  inches in length, and immediately over the most prominent part of the growth, i.e., over the angle of the jaw involving part of the cheek and the neck; the tumour tissue was thick and tough necessitating rather difficult dissection; the duct was isolated as well as possible and the pedicle finally removed by clamping same with a haemostat and twisting same, thus good cleavage was procured with little bleeding; the operation was completed

by removal of the tonsils and adenoids. Twelve calculi were found within the tumour the smaller ones being in the duct; the smallest was nearest to the mouth; the larger were in the tumour mass, which was a part of the parotid gland with doubt, though very intimately fused with the buccal muscular tissue. The calculi graduated in size from that of a pin-head to that of a small pea; they were hard, rough, and more inclined to be spherical, though somewhat faceted. The wound was closed with fine silk-worm sutures which were removed March 1st when all healing was complete and saliva dropping out of the duct at the normal opening opposite the second upper molar. He only remained in the hospital for six days.

(He called on me a few months ago, having been away in Western Canada, and one can hardly detect any scar).

The pathologist's and chemist's reports are herewith presented:—Montreal, February 17th, 1922, the Montreal General Hospital, Wm. J. Scott, Asst. Director Pathological Department, writes:—(in part)

"The specimens consisted of two small rounded concretions about the size of small peas. The surface of same is grayish white, blood stained in places, and here and there slightly roughened by particles of firm red tissue which are strongly adherent.

One specimen is slightly larger than its fellow and presents a flat surface where the superficial shell appears to have been broken away, revealing a white plaster-like material which is quite hard. The concretions cannot be crushed between the fingers.

There is slight flattening of the surface in places but the specimens are not typically faceted. The combined weight is two-tenths of a gram."

Dr. Rabinowitch of the same institution reports chemically as follows:—"Analysis of 'stones' from salivary gland.

The stones were macerated and apparently two different forms of matter were obtained, a blood stained capsule and an inner white powder.

Analysis of capsule. On platinum foil, it burned with a yellow flame, yielding an odor similar to burning feathers.

It was insoluble in alcohol and ether, but soluble in KOH on heating; from this it could be precipitated with acetic acid and  $H_2S$ .

Analysis of white matter: On platinum foil it did not burn, caused no effervescence with HCL, and when gently heated and treated with HCL it did not effervesce. On treatment with KOH no odor of ammonia was noticed. It dissolved in acetic acid, and precipitated with ammonia. Diagnosis, phosphates.

*Résumé*: Phosphate stone coated with fibrin."

**Tonsillar and Rheumatic Infections.**—The occurrence of tonsillar infection in cardiovascular disease was investigated by H. S. Starling (*Guy's Hosp. Rep.* 73:338, Oct., 1923). In cases of mitral or aortic diseases or both combined, the incidence, the incidence of tonsillar infection in patients under 30 was 81.62 per cent., and 61.3 per cent. in patients over 30. Only about one-third of these patients gave a history of sore throat. From his observation of these cases of rheumatic heart disease, Starling has been forced to the conviction that tonsillar infection is the chief portal for rheumatic infection, and also, although to a lesser degree, the chief source of infection in such cases. The presence of enlarged lymph glands under the jaw is regarded as a more constant proof of tonsillar infection than the appear-

ance of the tonsils themselves. In the course of rheumatic infection, the earlier the tonsils are removed the greater is the benefit derived. The benefits of the operation are manifested not only in the acquisition of a healthy colour, an increase in weight and physical efficiency, but also in the prevention of further infection of the endocardium and an apparent mitigation of the damage already suffered by it. The operation also effects the removal of an infective focus, the toxin from which is prejudicial to the heart muscle as well as to the whole system. After the operation, the patient, whenever possible, should be placed in an environment of open air and sunshine, in order that his general nutrition should be raised to the highest level.

## NAEVI AND THEIR TREATMENT BY RADIUM

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A NAEVUS is a vascular anomaly of congenital origin involving capillaries, veins or arteries, producing dilatation of the vessel walls and implicating not only the vessels which are normally present in the part, but adventitious vessels which are projected into and form a part of the vascular mass.

While of congenital origin and usually appearing either at birth or in early infancy, their manifestation is sometimes delayed till adult life, and occasionally until old age.

As a rule, they increase slowly in size, keeping pace with the body growth; when the full stature is reached the neoplasm ordinarily remains stationary.

At any stage in its developmental cycle, clinical retrogression may supervene and the blemish be slowly and gradually effaced, without inflammatory reaction in the parts affected. Sometimes, however, localized inflammation with spontaneous ulceration sets in, to be followed by slow healing and obliteration of the growth by the gradual deposition of scar tissue. This change is usually ascribed to trauma, or to direct infection of the naevus, but adequate proofs of the correctness of this hypothesis are lacking. The real and determinate cause of this remarkable transformation is shrouded in mystery. In a patient referred to me by Dr. J. E. Lehmann of Winnipeg, it was noted that the child was stricken with all the symptoms of an acute systemic infection, that thrombosis of the vessels was evidently the first pathological change, since no haemorrhage took place, although localized gangrene with extensive sloughing down to the deep fascia in the arm, together with abscess formation of the axillary glands ensued. See Figures 1 and 2.

Naevi may be classified as regards the parts invaded; anatomically into: cutaneous, sub-cutaneous, mixed. As regards their clinical characteristics into: vascular and pigmented.

The capillary naevus is inset in the superficial layers of the epidermis. The colour is red or purplish, the shade being determined by the development of the naevus from either the venous or arterial side of the capillaries. These lesions may be flat, level with the surface of the skin, or moderately elevated. Pressure ordinarily obliterates the vessels and blanches the tissues. The port wine stain or *naevus flammeus* is usually of a red or violet hue. It is frequently seen on the face, sometimes on the extremities or trunk, and may be circumscribed or widely distributed.

The cavernous naevus presents as a soft boggy compressible, subcutaneous tumour; the overlying skin may be normal, but anomalies of the vascular supply in the skin are often noted. Frequently the superficial capillary type obtains in the epidermis, together with the deep or cavernous variety in the subjacent regions, giving rise to the capillary-cavernous form of the affection. The spider naevus is characterized by a dilated venule or arteriole centrally placed, while ramifying from this centre are several wavy lines which gradually fade into the surrounding tissue. Pigmented naevi vary in colour from light brown to ebony black; they may be classified as follows:

*Naevus spilus*.—Smooth, flat, pigmented, macular lesions,—a simple staining of the epidermis, due to an abnormal pigmentary deposit locally.

*Naevus pilosus*.—Pigmented naevi covered with hairs which may be soft and downy, or stiff, coarse, and wiry.

*Naevus verrucosus*.—Pigmentary lesions with a warty or papillomatous surface with or without hair growth.

*Naevus lipomatodes*.—Are elevated pigmentary lesions with connective tissue and fat hypertrophy.

*Naevus linearis*.—Is a variety in which pig-



mentary or more commonly warty lesions develop in lines, frequently following the course and distribution of the nerve trunks.

*Treatment of Naevi.*

Carbonic acid snow is a valuable agent for the removal of the superficial vascular naevi. It is, however, rather painful and there is some danger of localized infection following its use. Radium is the remedy of choice for this variety. In the case of young children it may be applied

treated with radium screened with 2 mm. brass held away from the skin by gauze or wood, one-half to one inch. The expedient of cross-firing that is, attacking the growth at different angles, increases the therapeutic efficacy of the radium exposures. A more efficient method is the implantation of radium. Two or three steel needles, each containing 12½ milligrams or radium element are placed two centimetres or further apart and buried in the



FIG. 1.—Baby W. Cavernous naevus of the arm and forearm.

during sleep. The dosage and technique should be carefully supervised. Scarring much more unsightly than the original lesion easily follows its injudicious use. For capillary naevi a 5 or 10 mg. plaque, the face of which is protected by oiled silk or dental rubber dam, is kept moving over the involved area allowing approximately 5 minutes for each square represented by the size of the plaque. It is desirable to avoid a marked reaction in the skin. The therapeutic charge should spend itself before further treatment is instituted. Six weeks is found a satisfactory interval between treatments. The deep or cavernous naevus may be



FIG. 2.—Baby W. Scar after spontaneous ulceration and healing of the lesions. Function of limb unimpaired.

mass from three to five hours. This method presents certain advantages. First,—the radium is in direct contact with the abnormal blood vessels. Second—the number of exposures are materially cut down. Third—transirradiation of the skin with its attendant cosmetic dangers is reduced to a minimum. Fourth—the cosmetic effect is better than by any other treatment. We have here delicate vascular endothelium bathed in a liberal blood supply and the stage is set for possible spectacular tissue changes from the radiation. In my experience no haemorrhage has taken place and no scarring in the path of the needle.

In the case of young children it is wiser to administer an anaesthetic; the skin is disinfected and perforated with a fine trocar. The radium needle threaded with silk, following the trocar track and entering at the periphery of the

The port wine stain is a difficult blemish to remove. The superficial variety, the type which blanches on pressure, is sometimes responsive to radium, but the deeply infiltrated variety which pressure does not efface, demands an unfavourable prognosis.



FIG. 3. Baby T. Before treatment.

growth, is buried up to the eye in the neoplasm. In patients difficult to control there is danger of losing the radium. As a safeguard, two ligatures may be passed through the needle eye, one ligature is threaded with a curved surgical needle, non-cutting edge which is passed through the skin circumjacent to the needle eye. The ends are then securely tied; this anchors the radium. When the exposure is completed this ligature is cut out and the remaining one is utilized to extract the radium needle. Three to four months should intervene between treatments by this method. In the management of spider naevi radium applied topically may be of service, but carbonic acid snow gives more satisfactory therapeutic results in my hands.



FIG. 4. Baby T. After treatment.

Excision offers the best prospect for the removal of hairy naevi; if radiation is pushed to the extent of destroying the hair follicle, scarring is likely to ensue.

The pigmented naevi must be handled with caution or the latent malignant tendency may be aroused. It is usually better to leave these lesions severely alone or to excise them widely. Radium has a limited field of usefulness. Illustrative photographs are appended.

*June 18th, 1921, Baby W.* Age 10 months.—A large muff-like cavernous naevus of the left forearm; 9 cm. in length and nearly encircling the arm. Fig. 1. August 19, 1921—inflammation in the birthmark; child very ill; vomiting at times; temperature 102.4-5; gangrene set in, and sloughing down to the muscle planes; healing with fine scar formation followed. Fig. 2.

*September 1st, 1921, Baby B.*—Spontaneous ulceration of the upper margin of the right ear. The process was arrested by radium and healing took place.

*June 20th, 1921, Baby T.*—Cavernous naevus of the right cheek; two 12½ mg. radium needles introduced under the lesions entering through the mucosa of the mouth; three-hour exposure given, and in addition a

10 mg. plaque applied to the skin surface for 15 minutes. There was also a vascular naevus of the lower eyelid. On September 23, 1921, under anaesthesia, this lesion was treated with a 10 mg. plaque and lead window screen, and a 20-minute exposure given. This was followed by obliteration of the blemish without scar formation. On the same date, the spot on the cheek was treated with a 10 mg. plaque for one hour. The same exposure was given on February 11th, 1922, and again on June 21st, 1922. Figs. 3 and 4.

October 12th, 1921, Baby G.—Age 4 months. A capillary cavernous naevus involving the left side of the



FIG. 5. Baby G. Cavernous naevus.

neck and both surfaces of the ear. The main part of the tumour was 5 x 6 cm. in the extremes and elevated 1 cm. above the skin surface. Two 12½ mg. needles were inserted into the vascular tumour and a four-hour exposure given, after which the lesion was gradually reduced in size. December 21, 1921—radium 10 mg. plaque applied to capillary naevus of the ear for 30 minutes, moving. June 23, 1922—two 12½ mg. needles inserted for five hours; October 14th, 1922—two needles inserted for 4 hours; February 24th, 1923—radium 10 mg. plaque for the capillary naevus 2 hours; May 25th,

1923—radium 10 mg. plaque three hours; August 20th, 1923—radium 10 mg. plaque two hours. Fig. 5 and 6.



FIG. 6. Baby G. Cavernous and capillary naevus ear and face after radium treatment.

Mrs. H., age 68.—Consulted me March 7th, 1922; a naevus, angle of the mouth, left side; with malignant degeneration; two 12½ mg. needles inserted subcutaneously at the edge of the ulcer, one on either side, and a five-hour exposure given. A letter, October 9th, 1923, stated: "The face healed thirty days after the treatment and has remained perfectly well, with very slight scar."

It should not be forgotten that over-radiation carries in its train embarrassing sequelae which may find expression in a radio-dermatitis, ranging in intensity from a transient erythema to deep and intractable ulcerations, to be followed later by telangiectasia, depigmentary changes, cutaneous atrophy, or keratoses, and occasionally by malignant degeneration.

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#### An Experimental Study of Multiple Sclerosis.

—The alleged spirochetal origin of disseminated sclerosis was studied by Joseph Collins and Hideyo Noguchi, New York, in eight cases. The negative results obtained indicate that the

demonstration of the *Spirochaeta argentine* and the experimental reproduction of multiple sclerosis in guinea-pigs and rabbits are difficult.

—*Jour. Am. Med. Ass.*, Dec., 1923.

## RECENT ADVANCES IN THE CONTROL OF DIPHTHERIA\*

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THE history of diphtheria is full of hills and valleys; elation at a discovery apparently solving the problem is followed by disappointment in that some unappreciated factor, working in an unforeseen manner gives another angle to the problem, necessitating further efforts. In the hurried march of passing events it is well to pause occasionally for meditation and analysis. The time would seem opportune to review the efforts to control diphtheria. It still remains a most perplexing problem, of interest everywhere. Forty years, four census periods, have passed since Loeffler identified the causative agent, ample interval for collecting data. Moreover, it is becoming to join in the birthday celebrations of Roux who has just reached the age of 72 and offer congratulation and gratitude for a life so full of successful effort for the advancement of scientific medicine and the prevention of disease.

In the control of any infectious disease three aspects should be considered; decreasing incidence, preventing fatality, and shortening quarantine. Before discussing these in detail some general factors concerning this disease should be noted. There has been a decided change in the clinical picture. The wide extension of the diphtheritic membrane is not seen so frequently now as in the early days; there is not so much "black diphtheria." In the early '80's 43% of the cases showed extension of the membrane into the respiratory tubes; from 1887 to 1907 this had decreased to less than 20%. From 1907 till 1911 a further decrease to 11% is noted, and in 1920 only 5% are recorded. The disease occurs in cycles; and there may also be a change in its severity from year to year. Yearly mortality rates alone may

not suffice for accurate deductions since in number or severity of cases any one year may not be exactly comparable with another. Nor are the months throughout any one year comparable. Formerly diphtheria was looked upon as an autumnal disease, but its autumnal nature is properly related, not to seasons, but to the educational system. The opening of schools after the long summer vacation, with the attendant close inter-communication of comparatively large groups from various separated localities, accounts sufficiently for the sharp rise in September and October which reaches its height about January, gradually dropping until June.

*Incidence.*—In spite of all the knowledge that forty years study has accumulated it is necessary to admit that statistics show a general increased incidence, such being recorded in such widely separated localities as Toronto, New-York, London and Copenhagen. At first sight this might be exceedingly discouraging, but close examination reveals that the surface appearance is deceptive. There are a number of factors which lead to an increased incidence, real or apparent. Density of population, bacterial diagnosis, and the number of susceptibles all have an important bearing.

*Density of Population.*—There is always a close relationship between the occurrence of diphtheria and the density of population. The disease is much more frequent and has a higher mortality in urban than in rural communities. Vaughan<sup>1</sup> gives the following statistics regarding rural and urban death rates:

|                        | 1900 | 1905 | 1910 | 1915 |
|------------------------|------|------|------|------|
| Urban Death Rate ..... | 52.4 | 30.1 | 25.7 | 17.5 |
| Rural " " .....        | 26.5 | 15   | 15.9 | 12.9 |

It is interesting to note that while in both rural and urban communities the death rate decreased sharply from 1900 to 1905 and that since 1905 most of the decrease in death rate

\*Read before the Vancouver Medical Association, March 4, 1924. It has been condensed for publication by omitting details of the Schick test results, methods of preparation of toxin-antitoxin mixtures and the technique of the intracutaneous tests.



has been in the urban communities, yet in the latter the death rate (and the incidence) is much higher than in the former. In this country and in the United States where emigration is such an important factor in population there is an increasing growth in the size of cities with the consequent increase of school attendance and a natural increase of diphtheria.

**Bacterial Diagnosis.**—There has been a very much increased use of bacterial diagnosis in this disease during the last twenty years. Not only do physicians avail themselves to a greater extent of health laboratory facilities in making an early diagnosis in almost all cases of sore throat, whether suspected of diphtheria or not, but health officials use this method for determining carriers among contacts. In recent years medical supervision of schools has reached a higher degree of perfection and is more generally undertaken. With it has come the excellent custom of obtaining cultures from all pupils in a room in which a case of diphtheria has been discovered. Undoubtedly these methods have increased the number of cases appearing as diphtheria in vital statistics. This does not necessarily mean that there has been a greater number of clinical cases for vital statistics do not differentiate between "clinical cases" and "carriers."

In the last twenty-five years there has been a decided advance in the accuracy of bacterial diagnosis. Although the Klebs-Loeffler bacillus is characterized by great variability in morphology, diphtheria is one of the few diseases in which it is possible to identify the causative organism by appearances; but so great a variability adds to the possibility of error. Westbrook's *Morphological Classification of Diphtheria Bacilli*<sup>2</sup> considerably clarified this trouble, offering a ready means for the more accurate identification of these organisms with the microscope. Since that time numerous modifications of staining methods have been advocated. One recently put forward by Albert<sup>3</sup> appears to have been successful in giving to these organisms a characteristic and easily recognizable appearance. A bacteriological diagnosis in any communicable disease in order to be practical must be rapid. Where rapidity is so essential morphology alone must be relied upon. Such a diagnosis tells of the presence

or absence of the bacilli, but nothing of their habits. The virulence of an organism upon which depends its capability of producing disease can be determined only by animal experimentation and not from microscopical appearance.

The accuracy of bacterial diagnosis depends in the first place upon the experience of the observer. There are, however, factors which are beyond his control. Very important is the length of incubation which has been given the culture. In its cultural existence the bacillus of diphtheria has comparatively slow, early growth, while other organisms frequently found in the flora of the mouth, having a rapid early growth, may obscure the early picture. For this reason at the end of 12 hours the absence of diphtheria bacilli is not conclusive. Eighteen hours is the ideal incubation period. In this laboratory 910 cultures have been examined in the last three months after both 12 and 18 hours' incubation; of this number 753 failed to show the occurrence of diphtheria bacilli on either examination, 71 showed diphtheria bacilli after 12 hours' incubation, and 86 showed diphtheria bacilli after 18 but not after 12 hours. Had the reports of less than 18 hours been taken as reliable 55% of positive cases would have been missed.

There is always the possibility of accidentally or intentionally missing the area in the nose or throat in which the diphtheria bacilli may be present. It has been reported in many laboratories that occasionally diphtheria bacilli will not be found in the nose and throat even when the disease goes on to death. Explanation of this phenomenon is difficult. More frequently it is found that the bacilli will persist for certain periods in an apparently healthy mucous membrane in individuals who have never suffered from the disease. However, as a general rule the advisability, utility, and accuracy of bacterial diagnosis is not disputed.

**Susceptibility.**—It has long been known that with apparently equal exposure some individuals will acquire and others escape the disease. Theobald Smith's classical work has shown that in guinea pigs active immunity in a parent may be transmitted to offspring as natural immunity. Schick<sup>4</sup> has shown that it

is possible to demonstrate natural antitoxin in the blood by determining its power of neutralizing diphtheria toxin; and the so-called "Schick test" is a ready mechanism for dividing any group in the community into immunes and susceptibles. The group in which the highest percentage of susceptibles occurs, is that under ten years of age so that each succeeding year, with the opening of schools, there comes a fresh group of susceptibles larger than the preceding one, ripe for infection.

Considerable controversy among the laity has arisen regarding this Schick test which has been confused with "active immunization." They are entirely different procedures. The Schick test is exceedingly simple and absolutely without danger. It consists in injecting intracutaneously on the flexor surface of the arm 1-50 of a minimum lethal dose for a 250 gram guinea pig of potent diphtheria toxin, freshly diluted with physiological salt solution. For adults (but not with children) a control is used, injecting at a different location an equal amount of the same toxin heated to destroy its toxic principles but leaving all the other elements of the potent toxin. A local inflammation at the site of inoculation of the unheated toxin indicates the lack of sufficient natural antitoxin in the individual to neutralize this very small amount of toxin. The absence of inflammation indicates the presence of at least 1-30 of a unit of antitoxin per cc. in the circulating fluids of that individual which is sufficient to prevent the local irritant action of the toxin. Park of New York has been the foremost on this continent to advocate the use of the Schick test. He describes<sup>5</sup> four different results that may be obtained at the site of the injected toxin, a "positive," a "negative," a "pseudo," or a "combined" reaction. As a result of a large number of tests, he gives the following statistics which confirm those obtained by Schick and correspond very closely with the age incidence of the disease:

|                      |     |                 |
|----------------------|-----|-----------------|
| Under 3 months ..... | 15% | are susceptible |
| " 3 - 6 " .....      | 30% | " "             |
| " 6 - 12 " .....     | 60% | " "             |
| " 1 - 2 yrs. ....    | 70% | " "             |
| " 2 - 3 " .....      | 60% | " "             |
| " 3 - 5 " .....      | 40% | " "             |
| " 5 - 10 " .....     | 30% | " "             |
| " 10 - 20 " .....    | 20% | " "             |
| Over 20 years .....  | 15% | " "             |

As a mechanism for decreasing morbidity Schick and Park recommend "active immunization" in those individuals who lack natural antitoxin. Active immunity must be sharply differentiated from passive immunity. Passive immunity is conferred by injecting an antibody-containing serum derived from an animal that has been actively immunized. It is immediate in its availability, the time of absorption depending upon the route of injection. Its degree will be proportionately related to the amount and strength of antibody serum given. Its duration is brief, lasting not longer than two or three weeks. Active immunization on the other hand, is the reaction in the individual himself against some foreign poison. It takes longer to develop, from three to six weeks; its duration is much longer, perhaps permanent; and the amount of antibody present is out of all proportion to the amount of antigen used.

In the original efforts of von Behring to produce active immunity a detoxicated toxin was employed. Schick and Park recommend for such purpose in the human a "ripened" toxin that has been partially neutralized by antitoxin, to which is given the name "toxin-antitoxin mixture." The technique consists of giving three injections at weekly intervals of one cc. amounts of a prepared mixture subcutaneously at the insertion of the deltoid muscle. Preparation of the mixture as originally recommended by Park is described by Zingher<sup>6</sup>; it contained three almost neutralized L + doses of toxin per cc.

Later Park recommended a new mixture containing 1-30 of the amount of toxin originally recommended, i.e., 0.1 L. + toxin unneutralized.

For the new preparation there is claimed almost equal efficiency, less danger and a diminution in severity of the local reaction. With the first preparation Park reports that one injection gives immunity to 80% of susceptibles; the second injection gives 90% and the third 97%. With the new mixture 87% of adults have been immunized and probably a higher percentage in children would be found if the data were available.

It must be remembered that this method of active immunization is not without dangers which, however, can usually be controlled. Ac-

cidents have happened. In Dallas, Texas, in 1919 during the course of immunization, fifty severe reactions and six deaths occurred due to an excessive amount of toxin in the mixture. In Massachusetts recently, at Concord and Bridgewater, a similar accident happened, apparently due to the release of toxin from a properly neutralized mixture by freezing<sup>8</sup>. Such dangers can usually be obviated if recourse be made to animal inoculation of every batch before it is applied to humans. In any event the beneficial results seem to outweigh the risk of any danger that may possibly exist in unforeseen accidents. In April of last year Park<sup>5</sup> reported that he had immunized 250,000 children in New York with a consequent and very marked decline not only in the incidence of the disease but also of the death rate.

**Fatality.**—Fatality in diphtheria is due to the action of diphtheria toxin on the body cells or to interference with the breathing apparatus by the presence of the membrane in the larynx or trachea. The latter is purely mechanical, and needs no discussion; it is upon a study of the former that hopes of betterment depend. Considerable change in ideas regarding this toxin is observable in recent literature. It is recognized by all that it quickly leaves the blood stream and becomes more or less firmly attached to the cells which it is to attack. The text-book teaching that it is a true exotoxin (meaning that it is a specific secretion or excretion from the bacilli, easily diffusible and soluble in the fluids of the body) is being questioned. Warden<sup>9</sup> claims that it is possible to make artificial toxin by using different combinations of saturated and unsaturated fatty acids, a work which so far has not been confirmed. Walbum and Dernby, working in Madsen's laboratory<sup>10</sup> have shown that extracts of diphtheria bacilli may not be very toxic, containing perhaps only 250 units of toxin per cc. If such a mild toxin be incubated with peptone solution for twenty hours it is found that the toxic property has risen to 600 units. If broth be substituted for the peptone in ten hours the solution will contain 1,000 units. In other words the extract of the bacilli in which no living organisms exist had manufactured toxin from the peptone and from the broth. Dernby suggests that these results may be attributed to the presence in the bacilli of a proteolytic

enzyme (liberated perhaps by autolysis) which acts upon the albumoses of the medium converting them into toxin. Vaughan's "split protein" theory suggests the same idea in a different manner. If such theories are verified it destroys the former belief that toxin is a specific secretion of the organism. The peculiar phenomenon appears to exist that diphtheria toxin must be present before more diphtheria toxin can be formed. Fitzgerald<sup>11</sup> claims to be able to detoxify virulent bacilli by washing them in salt solution; and the presence of a limited amount of antitoxin in the blood, natural as demonstrated by the Schick test or conferred by "prophylactic" injection, apparently possesses the power of preventing further production of toxin by neutralizing the first toxin produced by the organism. Undoubtedly immunity in this or any bacterial disease is not a finished book; many chapters remain to be written before final stability in ideas is attained. Nevertheless, from a practical standpoint much definite information is available.

Toxic death in diphtheria is due to the paralyzing action on muscles of the heart, of the throat, or of the diaphragm, resulting in heart failure, aspiration pneumonia, or paralysis of respiration. Heart failure may occur during the toxic stage or convalescence, any time up to the first three weeks and causes 87% of toxic deaths; aspiration pneumonia usually in the fourth or fifth week causing 2%; paralysis of respiration during or after the sixth week causing 11%.

A curve of diphtheria mortality rates from 1880 to the present time shows a marked and sudden drop during the ten year interval 1895 to 1905 not found in any other disease during this period. Previous to this interval the rate had been uniformly high and subsequently there has been only a steady decline paralleling closely that going on in other diseases, preventable and non-preventable. Obviously something particularly related to diphtheria occurred during this ten year period that has not occurred before or since or for any other disease. That something was diphtheria antitoxin. The association of the two events cannot be denied.

Some thirty-five years have elapsed since von Behring, Roux and Kitasato gave antitoxin to the world, a time sufficient for a thorough

trial. It has not been found wanting, but has justified the expectation that it would occupy the premier position among therapeutic agents for the cure of infectious disease. After so extended a period of observation its value and limitations are susceptible of demonstration by verified and carefully tabulated statistics. There are a number of interesting factors concerning its therapeutic action but by far the most important is its relation to fatality. Valdemar Bie<sup>13</sup>, fortunate in his position of chief physician at the Blegdam Hospital, Copenhagen, and in his close association with Madsen and the Danish State Serum Institute, has made an exceptionally painstaking and thorough investigation along these lines, well worthy of most careful perusal. He suggests and has tried a method of treatment the results of which are so far in advance of any elsewhere obtained that a short review of his work is of exceeding interest.

In any survey of its effect upon fatality it is necessary to differentiate between mild and severe cases of the disease, otherwise misconceptions will arise from overloading the figures with mild cases many of which do not need antitoxin. Severity can be roughly estimated by the extent of the membrane, which is closely related to the toxin-producing power of the bacteria. Bie divides diphtheria of the fauces into eight classes, which for convenience may be collected into four groups. Group I consists of mild cases where the membrane does not extend beyond the tonsils; Group II, rather severe cases where the membrane extends a little beyond the tonsils; Group III, very severe cases where the membrane involves the uvula, and Group IV, most severe cases where the

membrane covers the soft palate and may extend to the hard palate. He points out that among the mild cases death does not often occur and that if there is only a very slight membrane the patients will get better without antitoxin. In his clinic there has not been a single death in Group I since 1908. The results which he has obtained for Groups II, III, and IV are tabulated in Table I (adapted from his tables). Cases of group I and nasal diphtheria are omitted since in these cases intoxication is very slight. Patients dying within 24 hours of admission are also omitted since obviously from them no deductions regarding the value of antitoxin can be made. The years selected for the table are not chosen at random, but with very definite ideas. The years 1896 and 1900 were used for comparison with the previous statistics made by Fabier in these years. The year 1908 was selected because that was the last year during which subcutaneous administration of antitoxin was used, and 1915 was the last year of his predecessor's regime. The years 1916 to 1919 are grouped in pairs so as to make the numbers comparable with those obtained for the fourteen months from January, 1920 to February 28, 1921. In 1916-1917 there was a decided increase in the doses of antitoxin, used intramuscularly alone (up to 53,000 units) which was further increased during 1918 and 1919 to 135,000 units. In 1920 and 1921 intravenous administration in addition to intramuscular was introduced and still larger amounts employed. In order to afford comparison with other localities the total number of cases, mild and severe with their fatality rate is indicated in the last two vertical columns.

TABLE I

| Years                       | Number of Cases |     |     |          | % Mortality |     |     |          | All Cases |     |
|-----------------------------|-----------------|-----|-----|----------|-------------|-----|-----|----------|-----------|-----|
|                             | Group II        | III | IV  | Together | Group II    | III | IV  | Together | No.       | %   |
| 1896, 1900, 1908 and 1915.  | 533             | 325 | 33  | 891      | 1.5         | 14  | 52  | 7.7      | 2648      | 2.6 |
| 1916 and 1917.....          | 220             | 196 | 18  | 434      | 0           | 11  | 67  | 7.6      | 1526      | 2.1 |
| 1918 and 1919.....          | 352             | 170 | 34  | 556      | 2           | 9   | 41  | 6.7      | 2465      | 1.5 |
| 1920 and Jan. to Feb., 1921 | 330             | 169 | 54  | 553      | 0.3         | 5   | 22  | 3.8      | 2342      | 0.9 |
| Total.....                  | 1435            | 860 | 139 | 2434     | ...         | ... | ... | ...      | ...       | ... |



Several very interesting points are observable in these statistics. In the first place there has been a very considerable increase in the number of the "most severe" cases, (Group IV). During the last period of 14 months there were nearly twice as many as in the previous two years, three times as many in 1916-1917 and almost twice as many as in the four years of the first line. In spite of this increase in number there has been a marked fall in the mortality, from 52% to 22%. There is not so great an increase in the number of cases in Groups II and III, but still in each there has been a decided drop in mortality, from 1.5 to 0.3% and from 14 to 5% respectively. Stated in other words the mortality in Group I (mild), has been reduced to zero and in Groups II, III, and IV to 1.5, 1.3 and 2.5 respectively of what it was in the four control years. The mortality in all cases has been reduced in this period from 2.5% at the beginning to 0.9% at the end. In the final six months the mortality of all cases was 0.7%. In the Vancouver General Hospital in 1923, 196 cases of diphtheria were treated with 8 deaths, a fatality of 4.08. Osgood<sup>14</sup> reports a fatality rate of 32% in a series of 40 severe cases but his doses of antitoxin both intravenous and intramuscular are very much smaller than those recommended by Bie whose practice is as follows:

"a. Patients with 'slight membrane' get no antitoxin.

b. Patients with "membrane of less than medium extent" (does not quite cover tonsils) receive 4,000—8,000 units on admission. The injection is not repeated on the following days unless the membrane spreads.

c. Patients with membrane of medium extent (covering the tonsils) receive 16,000 to 20,000 units when admitted. The injection is not repeated on the following days unless the membrane spreads.

(a, b and c are included in Group I of the Table).

d. Patients with "membrane of greater than medium extent" (Group II) under 10 years of age they get 32,000 units on admission, and when 10 or over they get 40,000 units on admission. If the membrane has not decreased the next day the same dose is repeated.

e. Patients with "extensive" (Group III) or "most extensive" (Group IV) membrane (ex-

tending to or beyond the uvula) receive under 10 years of age 80,000 units on admission and 12 to 24 hours later, 60,000 units; another 12 hours later 20,000 units, making a total of 160,000 units; when 10 years old or over they get 100,000 units on admission, 12 to 24 hours later 80,000 units and again 12 hours later 40,000 units making a total of 220,000 units."

Whenever possible 20 cc. of the first dose of antitoxin is given intravenously to patients of groups "d" and "e" (greater than medium extent, extensive, and most extensive membrane). Apart from this, intramuscular injection only is employed because the antitoxin injected intramuscularly on admission renders a later intravenous injection superfluous." The largest single dose that was given was 196,000 units and the largest total amount 350,000 units. The largest quantity given any patient was 250 cc. of serum.

The remarkable drop in the death rate can be accounted for only by the method of treatment which was undertaken as a result of extensive investigation. Madsen and workers in his laboratory long ago showed the superiority in rapid absorption of intramuscular application over subcutaneous. Intravenous administration affords immediate availability in the blood of antitoxin which tends to begin decreasing at about the time absorption from intramuscular injection reaches the maximum. The ideal method therefore is a combination in proper doses of intravenous and intramuscular injection at the same time. In contradiction to the usual recommendations found in text-books he emphasizes the advisability of exceedingly large doses. Madsen says, "It is the rational mode of procedure to give all the antitoxin one desires and is able to give in the course of the first day."

These large doses of antitoxin raise interesting points. Where they are so massive, bulk is to be considered, for there is a limit to the amount of fluid of this type that can be injected into a child. Gibson's method of concentration (1907) now universally adopted was the first step in this direction and others have followed. Various workers have shown that there is a non-specific stimulation of antibodies. Wright's celebrated experiments indicate an increase through the action of massage treatment. Adami claims a fresh formation of

typhoid agglutinins in a previously immunized individual by a shocking stimulation such as an unexpected emersion in ice-water. Madsen<sup>10</sup> shows that certain metallic salts known to be pronounced catalysers such as manganous chloride, nickel chloride, or zinc chloride and alkaloids like pilocarpin have the same effect. In horses undergoing active immunization against diphtheria he has been able by treating them with these chemicals, to almost double the antibody concentration in their blood. These facts open a very wide vista.

The results obtained by such large doses indicate a property of antitoxin additional to its neutralizing effect. The quantity of free toxin in the circulating blood even in severe cases, is comparatively small, and the dose of antitoxin ordinarily employed is more than sufficient to neutralize it and still leave antitoxin free in the blood stream. The beneficial results noted from the massive doses seem to show that if given early it is possible, to an appreciable extent, to break the union of the toxin with the cell and therefore to effect a curative process

from Philadelphia experience, comprising some thirteen thousand cases over the period from 1904 to 1913. The fatality rates corresponding to the day of the disease on which antitoxin was begun are as follows:

|                      |      |
|----------------------|------|
| First day .....      | 0.4  |
| Second day .....     | 5    |
| Third day .....      | 8.3  |
| Fourth day .....     | 10.7 |
| Fifth day .....      | 11.2 |
| Sixth day .....      | 14.2 |
| After sixth day..... | 13.1 |

Delay in giving antitoxin decreases expectancy of a successful issue. Vaughan's interesting figures previously referred to, comparing the death rate in urban and rural communities are suggestive. The highest fatality usually occurs in cities of smaller size, 10,000 to 20,000 which apparently have all the disadvantages of the larger communities without any of their compensating advantages. Fitzgerald<sup>12</sup> presents some interesting figures comparing fatality rates in individuals treated at home and those treated in the hospital. A modification of his table is reproduced in Table II.

TABLE II  
Deaths from Diphtheria in Toronto, 1912-1919

| Year      | No. Treated |      | No. Deaths |      | Fatality Rate % |      |           |      |
|-----------|-------------|------|------------|------|-----------------|------|-----------|------|
|           | Hospital    | Home | Hospital   | Home | Crude           |      | Corrected |      |
|           |             |      |            |      | Hospital        | Home | Hospital  | Home |
| 1912..... | 663         | 720  | 53         | 91   | 8               | 12.6 | ...       | —    |
| 1913..... | 569         | 326  | 35 (18)    | 33   | 6               | 10   | 3         | 15   |
| 1914..... | 601         | 272  | 47 (11)    | 28   | 7.8             | 10   | 6         | 14.3 |
| 1915..... | 537         | 209  | 35 (14)    | 27   | 6.7             | 12.9 | 3.9       | 20   |
| 1916..... | 884         | 365  | 62 (30)    | 48   | 7               | 13.1 | 3.6       | 21   |
| 1917..... | 1124        | 321  | 47 (30)    | 35   | 4.2             | 10.9 | 0.9       | 20   |
| 1918..... | 1015        | 158  | 65 (25)    | 31   | 6               | 19   | 3.9       | 35   |
| 1919..... | 1327        | 805  | 96 (24)    | 72   | 7.3             | 9    | 5.4       | 12   |

in addition to the neutralization of free toxin. The idea of the possibility of breaking this union is rendered more tenable by the recent unfortunate experience in Massachusetts resulting from the breaking down of such a strong combination as toxin with antitoxin by freezing and thawing<sup>8</sup>.

There are factors other than the dosage of antitoxin concerned in a high fatality rate. Kolmer<sup>14</sup> gives some very interesting statistics

In this table the figures in brackets under hospital deaths indicate the number of individuals who died within 24 hours of the admission to the hospital, the responsibility for which probably belongs to the treatment, or lack of treatment, received before admission and these figures should, therefore, be transferred to the home column. The "crude fatality rates" have been obtained from the deaths actually occurring "in the hospital"

and "at home" and the "corrected fatality rates" by transferring the figures in brackets from the hospital deaths to the home deaths. The marked difference between the fatality rates is very striking and affords sufficient basis for the increasing demand for adequate hospital facilities for all infectious diseases. The difference between the figures of Toronto and Copenhagen would seem to justify the opinion that treatment in this disease is better placed in the hands of specialists in the hospital than left to the varying treatment of practising physicians.

*Duration of Quarantine.*—There is probably no aspect of diphtheria that is more difficult than that of quarantine. Any method that can shorten this period would be hailed with relief by all. The derivation of the word indicates forty days. It is generally accepted that in 50% of cases the bacilli will remain at least three to five days or longer after the membrane has disappeared, which Bie shows takes anywhere from three to 20 days. One can therefore expect a patient to be free from diphtheria bacilli three to four weeks after the beginning of the disease. It is impossible, however, to prophesy how long diphtheria bacilli may persist. Attempts at averaging are made but usually accompanied by the statement that "in some instances virulent organisms may remain for months." It is just in these cases that the greatest amount of difficulty lies. It is certain, however, that persistence will be longer if other pathological conditions exist in the air passages such as obstruction, diseased tonsils, etc. In a number of cases of persistent nasal infection foreign bodies of all sorts have been found. The old fashioned shoe-button, hay seeds, in fact anything that a child can push into its nostril and lose, may act sufficiently as an irritant to permit diphtheria bacilli to remain for a very long time.

Efforts to free an infected individual of persistent diphtheria bacilli have been numerous and various. Obviously one of the first should be to remedy pathological conditions or obstructions. Mechanical means such as massage of diseased tonsils has been advocated. Antiseptics are frequently employed. Of late years painting with silver nitrate (well into the crypts of the tonsils) and meurocrome have been much in favour. Some years ago heavy

earths such as kaolin, used as a dusting powder in the throat seemed to produce favourable results. Some workers have recommended "pyocyane" (a ferment liberated into a broth culture by *Bacillus pyocyaneus*, used as a spray. "Over riding" with other bacteria known to be antagonistic to diphtheria bacilli has offered great expectations. Living broth cultures of *Staphylococcus aureus* as a spray have been used for this purpose with apparent success. They are, however, not without danger. Lactic acid bacilli have been advocated with apparently equal success. Their advantage lies in the fact that they are easily obtainable, any good "unpasteurized" milk soured serving as a gargle. It must be admitted, however, that there is no sure cure for diphtheria carriers.

More recently a change of ideas regarding carriers has been apparent. It is only virulent diphtheria bacilli that are dangerous so that quarantine should depend upon the presence of virulent diphtheria bacilli. Estimation of virulence has long been a laboratory procedure. Until recently it has been a rather long-drawn out technique occupying at least 8 to 12 days, too long for routine use, especially in contact cases. The original virulence test was made by subcutaneous injection of 48 hour broth cultures, pure strains from the field cultures having been first isolated. Roemer has shown the feasibility of an intracutaneous test in which the determination is obtainable within 48 to 72 hours. Wayson of the United States Public Health Service suggested the use of field cultures and this aspect has been fairly well worked out by Force and Beatty<sup>16</sup>, Havens and Powell<sup>17</sup> and others, who have shown that the presence of contaminating organisms in the original diagnostic culture will not interfere with typical results. This saves a good deal of time since pure cultures do not have to be isolated and in addition permits a determination in those cultures from which it is not possible to obtain pure strains.

This method is coming into very general use and is of particular advantage in assisting school authorities in the control of diphtheria. Kelly and Potter<sup>18</sup> in a survey of certain schools where diphtheria was prevalent have shown that as high as 47% of the carriers found, were non-virulent and could therefore

be released in three days, thus considerably shortening their period of quarantine and decreasing the interruption with their school work. Obviously in clinical cases a virulence test is not indicated since the disease is test enough, but in contacts and in carriers it seems only reasonable to use the mechanism thus provided for reducing interference in their activities to a minimum.

Many interesting aspects remain in the study of diphtheria. Prevalent ideas regarding toxicity and immunity are subject to considerable revision before the solution of the problems related thereto can be accepted as final; a fertile field is offered for the most imaginative investigator. In spite of theoretical uncertainty certain practical applications have been acceptably established. It is possible to identify the organism quickly and accurately; to ascertain which strains are dangerous to the individuals, and which individuals are dangerous to the community; to determine who are susceptible and to confer on them immunity, probably lasting; and to materially reduce fatality. These are great achievements. Failures must also be recorded. There is still lacking a sufficient appreciation in the community of its responsibility for community damage; there is necessity for a wide-spread dissemination of the

knowledge already attained and its application to the public. With such a little more it would be possible for man to crown his labours and attach to diphtheria the triumphant label "Conquered."

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**A Valuable Contribution of Animal Experimentation.**—There are scattered indications that the lessons learned through irradiation of the laboratory animals apply equally well to man. Erythema doses or larger doses given over the abdomen or the intestinal areas may cause injury to this sensitive intestinal epithelium. Particular care should be taken when "cross fire" is used over areas that include intestinal coils, as the loops may be seriously injured. As Warren and Whipple carefully point out, the sensitiveness of the intestine, in contrast to some of the other internal organs, to penetrating irradiation must not be interpreted as a contraindication to the use of hard or short wave length roentgen rays produced by the modern roentgen-ray tube and high power machines. Radium, they add, can produce serious injury, but this does not contra-

indicate its use in proper cases, with a clear understanding of all its effects. Their experiments indicate that these hard roentgen rays can injure intestinal cells deep in the abdomen, and this arouses hopes that similar influence may be exerted on deep lying tumours; but careful judgment is required when considerable doses of roentgen rays are to be given so as to involve intestinal areas. Thus the observation on the common laboratory animals indicating that irradiation over the abdomen can cause a common intestinal pathologic condition and clinical pictures give, on the one hand, due warning to the radiologist who contemplates radiotherapy of abdominal areas; and, on the other, it points to new possibilities of progress through the use of potent radiations.—*Jour. Am. Med. Ass.*, Dec. 8. 1923.



## THE STANDARDIZATION AND VALUE OF THYROID PREPARATIONS

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WITH the exception of adrenin, and possibly of extracts of posterior pituitary, endocrine gland preparations are obviously difficult to standardize, even when, as in the case of the thyroid, they are of proved value.

Although Kendall has isolated a pure chemical substance, thyroxin, which has been shown to possess all the physiological properties of the thyroid, yet until its cost to the patient can be considerably reduced there appears to be no obvious advantage in using it rather than a properly standardized thyroid preparation, especially since, by entirely different methods, Reid Hunt<sup>1</sup> and I<sup>2</sup> have shown that, compared on basis of iodine content, thyroxin is not nearly as effective as thyroid, while, since according to Kendall<sup>3</sup> thyroxin only represents about one-quarter of the thyroid-iodine, this reduces its relative effectiveness to probably not more than one-eighth of that of a corresponding amount of thyroid, even when the thyroxin is injected.

The only other thyroid compound which can be prepared in a pure form is iodothyroglobulin, first isolated by Oswald in 1899<sup>4</sup>. Its iodine content varies with that of the thyroid from which it is prepared. Experiments (still unpublished) in this laboratory show that, compared by iodine content, it possesses approximately equal activity with thyroid. There is nothing to suggest that any advantage would be gained by substituting this compound for preparations of the whole gland. Beebe's "thyroprotein," placed on the market a number of years ago, would appear to be chiefly an impure preparation of this compound.

Baumann's iodothyryn<sup>5</sup>, still on the market, is a mixture of unknown composition, prepared by the action of sulphuric acid on the gland. While it undoubtedly possesses thyroid activity, this does not appear to be greater than that of the amount of thyroid used for its prepar-

ation, and seems to be very variable according to the particular method of preparation used. It certainly is less reliable than thyroid.

"Thyreo-glandol," a preparation stated to be made by perfusing the freshly removed thyroid with physiological saline solution, and to contain no protein nor iodine, is very active according to Asher<sup>6</sup>, but it is doubtful whether any reliance can be placed on the test he employed, the strengthening of the adrenin reaction with the Laewen-Trendelenburg heart-strip preparation. Recent work by Romeis<sup>7</sup> renders it probable that any positive results given by such preparations are due to minute traces of the essential thyroid compound.

It is obviously important that if thyroid preparations are still to be used for a long time they should be accurately standardized and comparable.

Thyroid tissue, of all mammalian tissue, possesses the unique property of containing distinct amounts of the element iodine. These amounts vary considerably, the two chief influencing factors being diet, as I have emphasized elsewhere<sup>8</sup>, and the activity of the animal, the latter being largely conditioned by climatic changes. The influence of the latter factor has been accurately studied by Seidell and Fenger<sup>9</sup>. They find that there are marked changes in the iodine content of the thyroid gland in the same species of animal killed in summer and in winter, the iodine percentage between June and November for American animals being in general from two to three times that between December and May. Martin's figures<sup>10</sup> for English sheep show a similar but much less variation; in general, figures for European animals are distinctly higher than those for the same species on this continent; this difference is to be attributed to difference in the iodine content of the diet.

There is a considerable body of evidence re-

lating the physiological activity of any thyroid preparation to its iodine content. Thyroid tissue when fed by mouth produces the following definite actions.

(a) It increases the basal metabolic rate of myxoedematous patients, in correct dosage restoring it to normal, the patient at the same time being completely restored to normal condition.

(b) It produces similar results with cretins, provided treatment is commenced at an early age.

(c) It increases nitrogen and phosphorus excretion, and as a result of the increased tissue catabolism exemplified by these increases the weight of the individual is decreased. This effect is of course not specific, any treatment producing increased catabolism inducing the same changes.

(d) It accelerates metamorphosis and retards growth in tadpoles of frogs and salamanders. This effect is not specific, but is produced by various iodine compounds.

(e) It decreases the growth-rate and causes hypertrophy of body-organs in young animals (rats, rabbits), a specific effect.

(f) It depletes the liver of the fed animal of its glycogen content.

(g) It increases the resistance of white mice to acetonitrile poisoning, a specific effect.

(h) In heavy doses it is definitely toxic, producing tachycardia and various other symptoms and, with continued heavy doses, death.

Dosage of myxoedematous and cretinoid patients by thyroid extract would appear to be largely empirical, and I am unaware of published data comparing results on the same patient of preparations of different iodine content.

Greater increase in nitrogen excretion, and greater loss of body-weight is produced by feeding preparations richer in iodine (Roos, Fonio, Peillon<sup>11</sup>). The reaction of tadpoles is stated to be proportional to the iodine content of the preparation (Lenhart<sup>12</sup>), and it is even stated that a ten per cent difference is detectable (Rogoff<sup>13</sup>). I have shown that the effect on growth-rate and organ-hypertrophy in young animals is greater the higher the percentage of iodine<sup>14</sup>. Reid Hunt has shown very conclusively that preparations with higher iodine content give greater resistance to acetonitrile

poisoning in mice, while equal dosage based on the iodine content gives absolutely equal results<sup>15</sup>. Heavy doses of iodine-rich thyroid are more toxic than corresponding doses of thyroid containing less iodine (Stoland<sup>16</sup>).

There is therefore abundant evidence relating the activity of the gland to its iodine content.

Of the biological tests available, Reid Hunt's, with acetonitrile, could perhaps be most conveniently used. But this shows clearly that the activity of any preparation is a function of the iodine content, and there would seem to be no advantage in its use if the iodine content is known, *unless there be suspicion of adulteration with iodine compounds, none of which, except thyroxin and iodothyroglobulin, possess the specific properties of thyroid.*

The tadpole test is obviously less easily carried out; it is doubtful if good comparable results with non-soluble thyroid preparations could be obtained, and it is certainly not specific either for frogs or for salamanders<sup>17</sup>, in spite of recent claims to the contrary, by Huxley<sup>18</sup> and Jensen<sup>19</sup>. Jensen states that, with Mexican axolotls, thyroid results do not parallel their iodine content, the only statement of this kind, and his methods have been criticized by Hunt<sup>20</sup>.

Hunt and Seidell<sup>21</sup> in 1911, drew the following conclusions: "There can be no doubt that the interests of both the producer and consumer would be safeguarded by the establishment of a reasonable Pharmacopoeial standard of iodine content..... such a limit could be fixed at approximately 0.2 per cent. iodine without causing undue hardship.... Of course sufficient latitude, of say 0.03 per cent. above or below this figure, should be permitted, thus making the extreme limits 0.17 to 0.23 per cent.

"The remaining Pharmacopoeial description which is necessary is that limiting the source of the raw material to certain animals and prescribing a reasonable limit of moisture and ash, which from our experiments might be placed at not exceeding 6 per cent for the former and 5 per cent for the latter, and finally the prohibition of all iodine in inorganic or any other form of combination than that peculiar to the thyroid."

This suggested standard has been adopted by the U.S. Pharmacopoeia, but the British

standard does not call for any particular iodine content, though a similar content is stated usually to be present in British preparations.

Van Os<sup>22</sup> in 1918, criticized the Dutch requirement of 0.4 per cent., pointing out that animal thyroids usually contained between 0.35 and 0.38 (sheep) or even less (swine). He considered that the maximum figure should not be greater than 0.3 per cent. As I have pointed out, on this continent the average figures are distinctly lower than those for animals in Europe.

Kendall's method of iodine estimation is one of the most accurate methods of analysis of small amounts of any element in biological

material that has been devised<sup>23</sup>. In the hands of different analysts it gives consistent results showing good agreement, as the following determinations by Dr. T. Ingvaldsen and myself on the same samples show:—

| Material  | Per Cent. Iodine |                |
|---|------------------|----------------|
|   | T. I.            | A. T. C.       |
| Seyllium canicula (dogfish) thyroids                    | 1.282            | 1.234<br>1.261 |
| Nereocystis lütkeana (giant kelp)<br>stipe and holdfast | 0.249            | 0.251          |
| Birpira polymorphus (sea-worm) tube                     | 0.625            | 0.639          |

The following table gives the results of a number of analyses of thyroid preparations, the powders obtained directly from the manufacturers, the tablets purchased recently from

| Country of origin | Manufacturer | Description   | No. of tablets taken | Actual weight taken mg. | Iodine present mg. | Iodine Percent          |                                       |
|-------------------|--------------|---|----------------------|-------------------------|--------------------|-------------------------|---------------------------------------|
|                   |              |   |                      |                         |                    | (1)<br>on actual weight | (2)<br>on gland tissue stated present |
| Germany...        | 1            | Powder: "Glandula Thyroidea"  | —                    | 0.5                     | 1.88               | 0.376                   | —                                     |
|                   |              |   |                      | 0.5                     | 1.90               | 0.380                   | —                                     |
|                   | 1            | Powder: "Thyroidin"   | —                    | 0.5                     | 1.84               | 0.368                   | —                                     |
|                   |              |   |                      | 0.5                     | 1.92               | 0.384                   | —                                     |
|                   | 1            | Powder: "Thyroidin"   | —                    | 0.5                     | 1.94               | 0.388                   | —                                     |
|                   |              |   |                      | 0.5                     | 1.97               | 0.394                   | —                                     |
| U.S.A.....        | 2            | Powder: 0.34 % I  | —                    | 0.2                     | 0.679              | 0.339                   | —                                     |
| Germany...        | 3            | Powder: "Thyraden"  | —                    | 0.5                     | 0.523              | 0.105                   | —                                     |
|                   |              |   |                      | 0.5                     | 0.508              | 0.102                   | —                                     |
|                   | 1            | Powder: "Glandula Thyroidea Bovina"   | —                    | 0.5                     | 2.16               | 0.432                   | —                                     |
|                   |              |   |                      | 0.5                     | 2.16               | 0.432                   | —                                     |
|                   | 1            | Tablets: 0.1 gm.  | 5                    | 1.2401                  | 1.438              | 0.116                   | 0.288                                 |
|                   |              |   | 5                    | 1.2646                  | 1.481              | 0.117                   | 0.296                                 |
|                   |              |   | 5                    | 1.2893                  | 1.495              | 0.116                   | 0.299                                 |
| Canada....        | 4            | Tablets: 2-grain, not less than 0.2 % I   | 3                    | 0.9741                  | 0.835              | 0.086                   | 0.215                                 |
|                   |              |   | 3                    | 0.9878                  | 0.859              | 0.087                   | 0.221                                 |
|                   |              |   | 3                    | 0.9784                  | 0.836              | 0.086                   | 0.215                                 |
|                   | 4            | Tablets: 1-grain, as preceding  | 6                    | 0.9796                  | 0.866              | 0.088                   | 0.222                                 |
|                   |              |   | 6                    | 0.9877                  | 0.881              | 0.089                   | 0.226                                 |
|                   |              |   | 6                    | 0.9973                  | 0.863              | 0.086                   | 0.222                                 |
|                   | 5            | Tablets: 1-5-grain, not less than 0.2 % I   | 10                   | 0.6834                  | 0.338              | 0.049                   | 0.261                                 |
|                   |              |   | 10                   | 0.6840                  | 0.331              | 0.048                   | 0.255                                 |
|                   | 5            | Tablets: 1-10-grain, as preceding   | 20                   | 0.6406                  | 0.293              | 0.046                   | 0.226                                 |
|                   |              |   |                      |                         |                    |                         |                                       |
| England....       | 6            | Tablets: each represents 5 grains fresh sheep's gland                                   | 3                    | 0.792                   | 1.16               | 0.146                   | 0.119                                 |
|                   |              |   | 3                    | 0.819                   | 1.23               | 0.150                   | 0.126                                 |
|                   |              |   | 3                    | 0.807                   | 1.20               | 0.149                   | 0.123                                 |
|                   | 6            | Tablets: each represents ½ grain fresh sheep's gland, containing not less than 0.05 % I | 20                   | 0.5102                  | 0.727              | 0.142                   | 0.112                                 |
|                   | 6            | Tablets: each represents ½ grain, as preceding  | 29                   | 0.9279                  | 0.821              | 0.088                   | 0.175                                 |
| Canada....        | 4            | Thyroprotein Beebe, tablets: 2-grain, containing 2% of thyroprotein                     | 10                   | 1.2813                  | 0.155              | 0.012                   | —                                     |
|                   |              |   | 15                   | 1.9714                  | 0.226              | 0.011                   | —                                     |
|                   |              |   | 15                   | 1.9701                  | 0.212              | 0.011                   | —                                     |

a local pharmacist (with the exception of the "thyroprotein Beebe" which has been in my possession for several years). With the exception of the first four powders, the analyses were kindly carried out for me by Dr. Ingvaldsen.

The results for the Beebe thyroprotein preparation, calculated to the stated "thyroprotein" content, give an iodine figure of about 0.6 per cent, which is of the right order for iodothyroglobulin preparations. It is obvious that tablets with such small dosage as these are of very little value.

It will be seen that in every case the iodine results agree with the minimum when such a minimum is specified. But in a number of cases the iodine content is much higher than this specified minimum. Although the thyroid effect is not directly proportional to the iodine content (*i.e.* a thyroid of twice the iodine content will not produce twice the physiological effect, but only a distinctly greater effect) nevertheless even a 50 per cent increase will give a physiological difference that should not be neglected in considering dosage.

The German powders tested were all pre-war preparations. On none was the iodine content stated. I have not examined any post-war samples from German firms. (It is interesting that Sehrt has recorded that the iodine content of sheep-thyroids in Germany at and after the end of the war was very small)<sup>24</sup>. The U. S. powder was supplied by request for research work, and my analysis agreed absolutely with that stated.

Many tests have shown that there is no detectable difference in using fresh thyroid over desiccated preparations for therapeutical purposes, while Hoskins<sup>25</sup> and others have shown that no difference exists in physiological properties. It is obviously much more difficult to relate exact dosage to the fresh gland as van Os points out, especially since the water ratio is by no means constant, and the usual statement that 1 grain of desiccated thyroid represents 5 grains of fresh gland is unlikely to be often true. Defatting is desirable, and does not remove the active constituent.

I have shown that properly prepared desiccated preparations do not deteriorate with age<sup>26</sup>.

It would appear, therefore, that thyroid pre-

parations should be dried and defatted, and their iodine content accurately determined. They can then be placed on the market in powder form, with an accurate statement as to method of preparation and iodine content, as Strauss, in a carefully thought out paper<sup>27</sup> recommends, in order to avoid the "danger which the tablet carries" in that "it places a peculiar restraint upon the physician's therapeutic endeavour." Strauss thinks that "the practitioner should prescribe the powder, which is supplied in bulk, in capsule form in such quantities and in such combinations as he believes fit each individual case."

If the manufacturer is to be allowed to assist the practitioner by supplying thyroid in tablet form, then such a statement should be furnished as would enable the practitioner to control the thyroid iodine dose. *It is necessary not only to insist on a minimum iodine value, but also on a maximum iodine value.* The U. S. Pharmacopoeial Standard can conveniently be adopted, but the ease of iodine standardization permits, and even makes desirable, a more stringent limit. There is no reason why this should not be fixed at from 0.19 to 0.21 per cent iodine in the desiccated gland. Since iodine values in different samples as obtained from the slaughter house and desiccated will seldom be found within this limit, the desired percentage can be obtained in either of two ways and either, if conscientiously carried out, will give the desired result. Samples of different value can be mixed in the correct proportions to give the standard value (the thyroxin proportion is constant; Hunt finds that samples from different animals' thyroids act proportionally to their iodine content). Or admixture of glands containing more than 0.2 per cent of iodine with milk-sugar might be permitted, with statement that the preparation contains desiccated thyroid equivalent to so many grains (or grams, when we become scientific) of desiccated thyroid containing 0.2 per cent iodine.

If the manufacturers' preparations can be standardized in such a fashion, then the onus of correct prescription will rest entirely on the physician, who will have been furnished with all the information necessary for the correct employment of this drug. He can check his dosage by basal metabolism measurements.



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## THE RELATION BETWEEN THE WIDTH OF THE PUPIL AND THE CARBON DIOXIDE CONTENT OF THE BLOOD\*

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IN Schmiedeberg's *Archiv. for Experimental Pathology and Pharmacology* (Vol. 100, Parts 3 and 4.) there appears an article on the relation between the size of the pupil and the carbon dioxide content of the blood by Hermann Wieland and Rudolf Schoen. Their researches are based on the observation that respiratory depression is accompanied by miosis. In all narcoses (moderate doses) there is depression of respiration and contraction of the pupil hence their conception of a causal connection between CO<sub>2</sub> content of blood and the size of the pupil. And so they divided their work into three larger groups:—

A.—Pupil changes in depressions of the respiratory centre by such agents as morphine and chloralhydrate.

B.—Width of the pupil with insufficient and excessive ventilation.

C.—Size of the pupil with variations in the alkali of the blood.

### Methods.

Most observations were made on man. Haldane's method for determining the alveolar air CO<sub>2</sub> was employed; the pupils were measured in mm.; fasting subjects were used because of the possibility of emesis and the probability of increased CO<sub>2</sub> of blood after

food as shown by Dodds<sup>1</sup>. Their controls consisted of two measurements of the pupil diameter and two CO<sub>2</sub> determinations. All observations were made in duplicate. Blind tests were carried out with NaCl. solutions.

### A. (1, 2, 3, 4 and 5)

1.—Pupil width and alveolar CO<sub>2</sub>—tension under morphine in man. Dose 20 mg. (1-3 gr.) to 3 mg. (1-20) per person. In all the effects ran in the same direction and in direct proportions to the size of the dose, that is, always the CO<sub>2</sub> goes up while the pupil becomes small, the latter effect remains longer than the former.

They point out that Haldane's method for CO<sub>2</sub> tension of alveolar air is not absolute in morphine cases because the subjects are unable to control the muscles of respiration to thoroughly expel the alveolar air, and hence there are some few variations in which CO<sub>2</sub> tension falls unusually early.

Variations in the size of the pupil were only seen in those experimental subjects who were made somewhat garrulous.

2.—CO<sub>2</sub> combining power of the blood after morphine in man.

They quote the findings of others (2, 3, and 4) to show that after morphine the CO<sub>2</sub> tension of blood goes up. A set of figures is shown of one case which is typical of all their obser-

\*From a report made before The Osler Reporting Society, February 22nd, 1924.

ventions where  $\text{CO}_2$  content of blood (in vol. %) went up after morphine from 62 in the control period to 65, and later to 68.5, at the same time the pupil width was markedly diminished. Alveolar  $\text{CO}_2$  tension figures in mm. Hg. increased in the main but with irregularities (due to the above mentioned weakness of Haldane's method).

3.—In a third set of observations the relations between the width of the pupil and the  $\text{CO}_2$  content of arterial blood were studied in dogs and the same effects were obtained.

And now attention is drawn to the fact that with increased  $\text{CO}_2$  of blood there is reduced alkalinity.

4.—In the cat morphine causes excitement and here we find mydriasis, and they show that the blood  $\text{CO}_2$  is reduced—hence they conclude that the widening of the pupil is due to lowered  $\text{CO}_2$ .

5.—With chloral they have only two cases in man and sleepiness is found before miosis.

#### B. (1 and 2)

1.—Insufficient ventilation. Rebreathing through a spirometer—three sets of results were obtained:—

(a) With the onset of suffocation the pupil is narrowed.

(b) At an involuntary ending of suffocation the pupil is dilated, before which it was contracted.

(c) At the onset of suffocation there was an initial widening followed by a constriction.

The explanation for group (a) is in accord with their other findings. That of the other two they refrain from considering at this time.

2.—Excessive Respiration. (Subjects breathing synchronously with a metronome). The results were of short duration because of the severity of the symptoms which were like those of tetany, lock-jaw, pawlike spasms of the hands, and itching. However, in this class of observations there is a diminution of blood  $\text{CO}_2$  and a widening of the pupil (acapnoea). Recovery is rapid. Deep breathing in morphine miosis causes a widening of the pupil. Again, at the height of this acapnoea with the administration of  $\text{CO}_2$  there is lightning-like contraction of the pupil.

C. 1 on man. 2 on Rabbits.

1.—(a) A table is shown setting forth typical

results of cases in which sodium bicarbonate was given by mouth. There follows increased  $\text{CO}_2$  tension of the alveolar air and changes in the pupil—to be sure small but nevertheless diminished.

(b) And now with the administration of ammonium chloride the  $\text{CO}_2$  is lowered and the pupil widened.

(c) Effects of alkalinity which accompanies digestion after a noonday meal results in an increase of alveolar  $\text{CO}_2$  and a diminution in the size of the pupil.

2.—When rabbits are given hydrochloric acid by mouth the pupil dilates. Also, if they are given acid phosphates intravenously there is a dilatation of the pupil.

#### Conclusions

Every increase of  $\text{CO}_2$  tension of blood caused by any means, whether by insufficient aeration, depression of the respiratory centre, or by increasing the  $\text{CO}_2$  combining alkalis, is accompanied by a contraction of the pupils, whereas a pupil dilatation is seen where the  $\text{CO}_2$  content is lowered. Width of pupil is, therefore, determined by the blood  $\text{CO}_2$  content.

Increase in  $\text{CO}_2$  excites the centre of the iris closing muscles above normal and decrease in  $\text{CO}_2$  paralyses it—hence the miosis of morphine, of natural sleep, of low grades of suffocation and of states of increased  $\text{CO}_2$  combining power of the blood.

In opposite conditions of diminished  $\text{CO}_2$  in blood (excessive respirations and decreased blood alkali) there is depression of the excitability of the sphincter centre and a resultant dilatation of the pupil.

$\text{CO}_2$  seems to be responsible in that it is permeable to cells from the blood, thus liberating H ions which lower the alkalinity.

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## ENURESIS\*

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THE control of bed-wetting has been a problem for physicians since the earliest days; the multiplicity of remedies for the condition suggests a weakness in correcting the cause of the trouble. The drugs employed show that the pharmacopoeia has been thoroughly searched in the endeavour to secure a medicine with a more or less specific action. But the very number recommended should convince one of their futility. During the 17th and 18th centuries, when the medicine of the day was saturated with mysticism the treatment was often of a bizarre nature; various contrivances were suggested as being useful to wear around the neck; the bed was made to face in a certain direction; and baths containing various decoctions and aromatic herbs were used. The child was immersed in such baths for long periods every day.

During the Victorian period when it was held that children were reared successfully only when sternly trained by corporal punishment, methods of an intensely cruel and forbidding nature were employed. Blows on the buttocks were advocated, and the ensuing redness of the parts was looked on as helping in the cure by its evidence of counter-irritation. As early as 1860 Forster pointed the way to a more humane method of treating these children: he says "corporal punishment in these cases is most unjustifiable and cruel. It is the surgeon's place to be the child's protector. The shame it suffers, if punishment were needed, is punishment enough." Since Forster's writings, local causes have been eagerly sought for as an explanation of the condition. Intestinal parasites have frequently been blamed for the trouble, but the rarity of parasites is not often enough thought of; in this part of the continent cases of enuresis are more commonly met with than are parasites. Acidity of the urine

is often mentioned, but in not one of the cases under review could an extra acidity be determined; in fact the specific gravity was generally low, indicating rather a polyuria. Giving of an alkali certainly appeared to have no specific action, and discontinuing it did not seem to affect the condition.

In three of the cases circumcision had been performed beforehand, as a means of cure, but without improvement of the condition. In one of these cases the father was anxious to have his son circumcised, as he himself had had this trouble until puberty, when he had been circumcised. He was told to have it done, and to return in two months time, but at the end of that time the enuresis still persisted. The prepuce was not adherent, but only very long. Certainly operation with a view to helping the enuresis should only be performed where the prepuce is adherent, but even then it is open to question whether the operation itself has been the means of cure, or whether the impression of the operation on the child's mind has been the main factor.

Tonic treatment with iron and arsenic has long been in vogue, and even in Forster's time protest was made against their indiscriminate use. The cases studied here did not show a greater percentage of malnutrition among the children with enuresis than amongst the ordinary run of the clinic. In fact, there were nearly as many cases of overweight children in the group as seriously malnourished ones. These drugs are probably of no more value in curing enuresis than they are in benefitting malnutrition.

The fact that incontinence frequently happens when a child sleeps on his back caused Sir Dominic Corrigan to recommend the raising of the foot of the bed to keep the urine away from the neck of the bladder. This treatment was more rational than that recommended by those who advocated blistering the sacrum to keep the child off his back. It is also more efficacious than the schemes for fastening

\*Read at the first annual meeting of the Canadian Society for the Study of Diseases of Children, Montreal, June 1923.

towels or other objects to the child in the hope that he will awaken should he assume the dorsal position. It is doubtful whether any of these remain in position well enough to have this effect, or, if they do, whether the child's rest is not interfered with sufficiently to cause more harm than good.

It was not until the end of the last century that the pathology of enuresis was understood. It was then that special attention to the training of the nervous system was urged as the most valuable way of curing this trouble. Numerous authors since then have called attention to the nervous mechanism governing the bladder, the act of micturition, and the voluntary control of the normal individual. During infancy only the lower centres are involved in micturition and defaecation. Micturition is essentially a reflex act and independent of the will; it is controlled by a centre in the lumbo-sacral cord connected with the bladder by the hypogastric and pelvic visceral nerves. With proper training the child should be able to draw attention to its desire to urinate during waking hours by the eighteenth month, and by the third or fourth year should waken when this desire is pressing. At these ages the conducting paths to the higher centres should be functioning completely. When the infantile condition continues these paths are not conducting properly, and the inhibitory stimuli may appear to be entirely lacking.

The first point is to determine whether the case is one of unconscious micturition or simple urgency. In the former, the child has no desire to micturate, but simply finds his clothes wet. This condition is rarely seen except when associated with marked mental deficiency, serious nervous diseases, or malformations of the urinary tract. One of our cases was thought to be due to stone in the kidney. She was transferred to the surgical service but some months after her operation she returned to the clinic with the enuresis as bad as ever, and it had persisted from the time of her discharge from the hospital. The stones were evidently just an accidental finding. She was, however, soon cured of the enuresis by attention to training of the nervous system. She later developed two attacks of chorea, but there was no return of the enuresis.

The vast majority of cases of enuresis are

really due to an urgency of micturition when the clothes are wet, and to lack of cerebral control during sleep when bed-wetting takes place. The causes are essentially nervous in origin, and are generally due to lack of training or injudicious management of the child. With this conception of the trouble in mind the management of the case becomes simple to direct, but difficult to get carried out. The prognosis can be arrived at quite accurately by the impression the mother has made on you. If she is seen to be a woman of character who will bravely carry out your directions, with enthusiasm and exactitude, and if the case is one of simple enuresis, you can promise a speedy cure in about twenty per cent of the children; and a cure in from three to six months in the vast majority of the more difficult kind.

Dulling of cerebral perception is the great cause of enuresis, and the correction of this must be the main point of attack. All other methods must be subsidiary, they as can only be of secondary importance. In this connection one must call attention to the dread felt by the child. He comes to the physician after having months or years of treatment elsewhere, most of this being directed towards shaming him into stopping the habit. He is in constant dread that he may be unable to stop a catastrophe. Each failure has accentuated this dread and has impressed him the more with the hopelessness of his trouble. If he has been punished the effect on the nervous system has only been accentuated.

The child must first be taught that the trouble is really not so desperate, that he can be cured, and that it is only a matter of time for this cure to take place; that it only keeps on because he is worried about it and keeps thinking of it. Such suggestions work wonders on the child's mind if the home environment is good enough to allow him to be taught mental stability. If the mother is too neurotic or too busy to be able to maintain the suggestion of the physician, the child should be placed in a different home or put in charge of a suitable nurse. The most important element is the cordial and continuous cooperation of the mother or nurse.

For the cure of the diurnal variety especially great assistance is secured by bladder



exercises taught the child by the mother. She goes to the toilet three times a day with the child and while he is urinating she tells him to stop while she counts three, then he can go on and finish. When he improves a little, so that the bladder will retain more urine, she may make him stop three times in this way. This procedure should be carried out also in the nocturnal variety of enuresis, although it is not as effectual as in the diurnal type. No measure will increase the child's confidence and develop the cerebral control of bladder inhibition so much as these simple exercises. They appeal to both mother and child, so that their cooperation is easily secured. Children wetting their clothes must be called from their play to urinate. This has to be done frequently enough to keep them dry. In the worst cases it may have to be done every half-hour for the first few days, but in most cases this period may be lengthened to two-hour intervals inside of two weeks. The quick improvement is gratifying to mother and child. Regularity of time is here of great importance as in the training of children generally.

The greatest self-sacrifice is demanded of the mother in the cure of the nocturnal variety. She must spend two or three wakeful nights to discover when wetting takes place. It is usually early in the evening, about two a.m., and just before the child awakens in the morning. Enuresis occurs at a fairly constant time when similar amounts of food and fluid are taken, and when the habits are similar from day to day. The waking of the child should precede the periods of wetting by about fifteen minutes, and must be thoroughly carried out. If he is in a very sound sleep his face may have to be washed with cold water. He is then told to urinate and is put back to bed at once. As the treatment progresses the middle periods of awakening may be gradually omitted.

Fluids should not be given the child after 4.30 p.m. He should have a light, dry supper, with not more than one ounce of milk or water. Soups, tea and coffee should be omitted entirely. Candies and sweets should be reserved as a reward for keeping dry. Much help may be got by rewarding a child, although this sometimes appears to maintain the dread of accidents which we are trying so hard to re-

move. Undoubtedly the common practice of giving children evening bottles and copious drinks of water during the time they should be learning right control of the bladder is responsible for many future cases of enuresis.

The second line of treatment must always be considered secondary to that already outlined. It consists in correcting all the child's faulty health habits. Most important of these is undoubtedly fatigue. Many of these children must have their play supervised and restrained. Most of them are very sound sleepers, owing to excessive fatigue. They must spend at least twelve hours in bed. School may have to be partially or entirely discontinued in the worst cases. Excessive home-work must be stopped; the quieter they can be kept between tea and bed-time the better.

Associated conditions must be dealt with not entirely because they may be etiological, but mainly because they lower the health of the child. Included under this heading is the removal of all physical defects whether they be of the eye, ear, throat or teeth. Constipation must also be corrected by regulating the diet and fluids; this will also help in correcting any excessive acidity or alkalinity of the urine.

Drugs have been left to the last as they form the least important part of the treatment. It is hard to conceive of any drug having a specific effect on this condition. Mothers have often told me that the child started wetting again as soon as the medicine was finished. In several of these cases who were on belladonna, as an antispasmodic, I have switched to large doses of strychnine without any change in the child's condition. I am convinced that the medicine only aided in the suggestion and acted as a placebo.

Surgical procedures such as dilating the bladder, passing sounds, or intraspinal injections, are crude and unscientific, as they do not deal with the modern conception of the pathology of the condition. My results with glandular treatment are not encouraging. The effect of pituitrin hypodermically has been disappointing when carefully checked by controls. Thyroid gland has not proved more beneficial, except in children a little below par mentally. Even here I am not satisfied that much of the improvement is due to the glandular extract.

## DEHYDRATION ANAEMIA

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IT has been recognized that the number of red cells per cmm. of blood and the haemoglobin content may vary considerably in the same individual, not only from day to day, but from hour to hour, and still maintain a normal mean.

There is, however, a peculiar, though not uncommon condition, in which the red cell count and the haemoglobin remain persistently high, despite the fact that the individuals appear decidedly anaemic. These patients complain of headache. They often have a sensation of fullness around the temples with a certain amount of stiffness and soreness of the cervical muscles. They are languid and easily tired. At times they experience dizzy sensations, and frequently, to use their own words, "cannot collect their thoughts." They do not sleep well, the appetite is variable and they are usually constipated. On physical examination the skin is found to be pale and usually dry. There are often well-marked "rings" under the eyes. The subcutaneous tissue is rather scanty and the muscles somewhat flabby. The general appearance is that of an individual decidedly below par. On examining the blood, however, one is surprised to find the specimen, when drawn, to be of a deep bluish red colour, thick, viscid, and in some instances, tarry in appearance. The number of red cells may be considerably above normal, even as high as 6,000,000, while the haemoglobin is correspondingly high, reaching as much as 110 to 120 per cent. The white cell count is usually within normal limits. The differential count shows a moderately high percentage of small mononuclears, and occasionally there is an eosinophilia of from 8 to 16 per cent.

The blood urea in the cases studied varied from 16 to 30 mgm. per 100 cc. while the creatinine ranged from 2 to 3 mgm. per 100 cc. The blood sugar was found to be normal. The urine shows a tendency to poor night concentration but otherwise there may be but little

abnormality. A short *résumé* of two cases will serve to illustrate the general clinical picture.

Mrs. C. A., age 65, complained of general weakness and lassitude. She had pains of an aching character in the cervical muscles and at the back of the eyes. She became tired on slight exertion and stated that at times she could not concentrate her thoughts on any particular subject. She was decidedly anaemic in appearance with puffiness under the eyes, bounded by deep "rings." The heart and lungs were normal, the arteries soft and the blood pressure 135-85. The urine showed a few leucocytes but was otherwise normal. She was constipated, otherwise there were no gastro-intestinal disturbances. The primary examination of the blood on May, 1922, showed 5,950,000 red cells, 6,500 white cells, 115% hg. (Sahli), blood urea 20 mgm. per 100 cc., blood creatinine 2 mgm. per 100 cc. and the blood sugar 0.04%. The average of five blood counts done during the first two weeks of observation was, red cells 5,600,000 white cells 7,200 and hg. 110. She was put upon a diet mainly of fruit and vegetables with large amounts of fluids, while sugar and proteids were restricted. At the end of two months her indefinite pains had disappeared; she was clear mentally and enjoyed attending to her household and social duties, while the average of five blood counts done during this period was found to be, red cells 3,900,000, white cells 8,400, and hg. 78%; blood urea 18 mgm. per 100 cc. and creatinine 1.5 mgm. per 100 cc.

Mrs. G. H., age 55, complained of a feeling of fullness over the temples, pain at back of eyes, almost constant frontal headache and occasional dizzy sensations. She was afraid to travel alone as she could not think sufficiently quickly or clearly to arrange details which would arise during a journey. She appeared anaemic, the skin was dry and the eyes heavy. Her general system, as far as could be made out, was normal.

The initial blood count done on July 10, 1922 showed, red cells 5,650,000, white cells 3,400 and hg. 112% (Sahli), blood urea 30 mgm. per 100 cc., creatinine 2.8 mgm. per 100 cc. and blood sugar 0.1%.

The urine showed a definite low night concentration.

A similar line of treatment as in the previous case was instituted with the result that at the end of two months the headaches had disappeared; she felt mentally clear and physically strong and was able to travel abroad. The average blood count during this time showed red cells 4,500,000, white cells 6,000 and hg. 88%. Blood urea 25 mgm. per 100 cc. and creatinine 2 mgm. per 100cc.

The cause of the condition is somewhat obscure. It may be, however, that these individuals are unable to accommodate themselves to the dehydrating effect of the hot, dry summer climate and the dry and often overheated atmosphere of the majority of dwellings and places of business and amusement, during the winter. Many of these patients derive consid-

erable though temporary relief from massage, which tends to promote a better circulation, while others who attend outdoor clinics, are very often given salines which tend only to further the concentration of the blood. Theoretically the best treatment would be the employment of some method by which the blood

the red cell count may drop as much as 1,000,000 per cmm., the haemoglobin may drop 10 to 20 per cent and the patients feel markedly better.

The following chart will tend to show the general improvement in the blood during treatment.

Average blood count during first two weeks of observation

Average blood count during next two months of continued treatment

|       | Age | Sex | R.C.      | W.C.  | Hg. % | R.C.      | W.C.  | Hg. % |
|-------|-----|-----|-----------|-------|-------|-----------|-------|-------|
| G. H. | 56  | F   | 5,565,000 | 6,000 | 110   | 4,100,000 | 5,600 | 85    |
| L. W. | 65  | F   | 6,110,000 | 7,000 | 120   | 5,400,000 | 5,000 | 90    |
| M. K. | 33  | F   | 5,900,000 | 8,000 | 105   | 4,700,000 | 6,000 | 87    |
| K. H. | 46  | M   | 5,350,000 | 7,600 | 104   | 4,500,000 | 7,200 | 85    |
| C. A. | 65  | F   | 5,600,000 | 7,200 | 110   | 3,900,000 | 8,400 | 78    |
| H. N. | 47  | M   | 5,250,000 | 6,000 | 100   | 4,700,000 | 6,000 | 88    |
| L. S. | 36  | F   | 5,925,000 | 8,000 | 106   | 4,800,000 | 7,000 | 90    |
| H. Y. | 50  | M   | 5,730,000 | 4,500 | 99    | 4,720,000 | 4,000 | 87    |
| S. M. | 29  | F   | 5,555,000 | 8,000 | 101   | 4,320,000 | 6,500 | 80    |
| R. T. | 41  | M   | 5,210,000 | 4,500 | 98    | 4,100,000 | 3,200 | 82    |

fluid would be increased without necessarily augmenting the number of the cellular elements. An intravenous saline in one of these patients produced a marked though transient improvement. If, however, they can be induced to drink large quantities of fluids and restrict their diet largely to fruit and vegetables their condition gradually improves. The complexion becomes more ruddy, the blood is less viscid,

I am indebted to Dr. Gordon Byers for his especial interest in this condition, several of the cases cited having consulted him primarily on account of headache which they attributed to possible ocular strain.

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**True and False Presystolic Murmurs.**—Further data are given by William D. Reid, Newton, Mass., concerning the mechanism of the crescendo murmur, and to reemphasize that there are two murmurs, one the so-called presystolic and the other properly termed presystolic, if one elects that terminology. Not all authorities to-day are satisfied with the term "presystolic" for the murmur of mitral stenosis. In 100 successive necropsies of medical cases, there were eight showing organic stenosis of the mitral valve, and but one of these was diagnosed in life. In none of the eight was any type of presystolic murmur noted. In two

other patients a presystolic murmur was recorded, but the necropsy disclosed no stenosis of the mitral orifice. The crescendo murmur ending in the first sound does not necessarily disappear when auricular fibrillation is present. It should be kept clearly in mind that there are two murmurs, one of rather rare occurrence, and produced by contraction of the auricle, and the other, which is more common, due to the first part of the ventricular systole. The latter murmur is due to a regurgitation of blood into the auricle. Confusing the true and the false presystolic murmurs leads to diagnostic errors. —*Jour. Am. Med. Ass.*, Mar. 29, 1924.

## AMPLIFIED HEART SOUNDS FOR AUDITORIUM DEMONSTRATION

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**I**N an effort to make the teaching of cardiac phenomena more effective the desirability of having some method of amplifying the heart sounds to the extent that all members of a class might hear, co-incidentally commends itself to all who have the responsibility of instructing students.

Progress in this direction has been associated with the names of Cabot, Abbott and others. There are apparent discrepancies in the degree of perfection so far achieved, but recent developments promise a greater success. Believing that the following method may offer some advantages, it is submitted as indicating a direction in which further progress may be hoped for.

The apparatus consists of the following units in circuit:— A.—The microphone; B.—The sound filter; C.—The amplifier; D.—The loud speaker.

The method of operation is as follows:—

The heart sounds strike the diaphragm and cause a current to flow in its associated circuit which varies according to the motion of the diaphragm. The accumulation of sounds by the microphone demand that the diaphragm vibration frequency should follow the vibration frequency of contracting heart muscle and consequently it is along this line that experiment is proceeding, in the selection of a type of microphone. In general this is accomplished by an ordinary stethoscope bell with rubber tube conduction of heart sounds to an insulated microphone where fluid oscillations will commute sound waves into variable electric impulses which, being relayed through the amplifier, becomes again heart sounds, augmented enormously, but still true to tone of the originating heart muscle. The microphone circuit then passes into a filter circuit which traps any currents of a frequency higher than that of the heart sounds and allows only the low frequency currents to pass through. This filter effectually eliminates any currents that may be

caused by room vibration affecting the microphone or that may originate in the microphone itself. After having passed through the filter the current is impressed on a four stage amplifier and then passes to the loud speaker.

Because of the fact that a transformer coupled amplifier, which is the type generally used in radio work, distorts on very low frequencies, a special amplifier of the resistance coupled type was designed. Sufficient volume may be obtained to fill a class room without sacrificing the quality of the tone and without causing any extraneous noises.

The loud speaker is a very important factor in the successful operation of this apparatus. The one used by the authors was selected because it gave maximum volume with a minimum of distortion and had provision for adjusting the air gap between the pole pieces and the diaphragm. The last feature is very important as the output current may be great enough to cause the diaphragm to strike the pole pieces and thus reproduction of true sounds would be prevented.

No claim is made at present for the general application of this method in practice, but its possibilities in class teaching in the laboratory or in the clinic seem to justify further efforts to perfect it.

When taken along with Waud's method of greatly enlarged graphic tracings by the electropolygraph as published in the *Journal American Medical Association*, it places in the hands of the teacher a method by which the student sees what is happening in the heart at the same instant the sound is produced. In other words, translation of acoustics into a recognition of cardiac haemo-dynamics and cardiac muscle contraction is made easier.

The apparatus as designed by the authors has been constructed by Benson Wilcox Electrical Co., London, Ont. to whom grateful acknowledgment is made.



## Case Reports

### ACUTE BORACIC ACID POISONING (FATAL)

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On February 25th, 1924 at 11 p.m., a boy aged 15 was referred from outside the city for admission to the Montreal General Hospital with a diagnosis of "Generalized Peritonitis."

*Personal history.*—He was born in Scotland and had lived in Canada 11 years. He had measles in childhood; glands, suspected of being tuberculous, developed in the neck in 1920; they cleared up with little delay, and since then he has always been bright and active till the present illness.

The *family history* is irrelevant, both parents being alive and well and the patient the only child.

*Present illness.*—About one month ago he took ill with an acute febrile attack, characterized by vomiting, diarrhoea, and very offensive bowel motions. He lost a considerable amount in weight, and was in bed for three weeks; the condition at the time was diagnosed as "paratyphoid fever." After the three weeks he was regarded as convalescent and was up and about but troubled with constipation. On Monday, February 18th, one week prior to admission he became listless during the afternoon and in the evening had a chill associated with severe abdominal pain. The temperature rose to 104°F. and he had a restless night. On the following day, Tuesday, he was seen by his physician who recognized a condition of constipation and ordered an enema to be given twice a day. These enemata consisted of six teaspoonsful of boracic acid powder in 6 cups of water. The enemata given on Tuesday and Wednesday were expelled with bowel movements. On the evening of Tuesday the child began to vomit, vomiting every hour very offensive material. On Wednesday a skin rash appeared. This rash was a bright red, and diffused generally over the body surface, more marked on the trunk, front and back. On

Thursday, the boracic acid enemata were discontinued and a saline Murphy drip substituted. The vomiting ceased and the rash commenced to fade. On Saturday two other boracic acid enemata were administered and the rash on Sunday morning was again intense. The patient was very ill; vomiting was continuous. There was high fever and abdominal pain. Patient was very dull and stuporose. The general condition on Monday was still more serious, patient comatose, vomiting frequent, and pulse rapid and small. Two more boracic acid enemata were given and were not expelled.

*Condition on admission.*—A well developed white male, fairly well nourished but showing indications of recent loss of weight. He lies on the back in a semi-conscious condition, dull and listless, roused with extreme difficulty and his attention cannot be fixed. The lips are cracked and bleeding; the teeth covered with sordes; the tongue and mouth in a foul condition; the fauces are reddened but show no evidence of any inflammatory lesion. The eyes present some conjunctivitis with a mucopurulent discharge; they are fixed and devoid of recognition. Pupils are dilated, equal and respond to light. There is an intense rash covering practically the whole skin surface, more marked on the trunk, front and back, but spreading to the extremities especially on the flexor surfaces, and also to the face, the bridge of the nose being particularly covered. This rash is an erythema, fading on pressure and to the touch is not at all pungently hot. There is no evidence of desquamation. The temperature is 101°F. respiration 24 and shallow, pulse 132 and small.

There is no enlargement of the lymphatic glands. The respiratory system is negative. The relative cardiac dullness is within normal limits, the heart sounds weak and rapid but regular and not associated with any murmur; B. P. 112/64. The abdomen is moderately flat, moves with respiration, non-resistant throughout, but there is well generalized tenderness with no point of acute tenderness. No masses

can be palpated. The flanks are tympanitic; liver dullness normal; hernial orifices vacant. The spleen is enlarged and its edge can be palpated. The external genitals are normal. There is incontinence of urine.

**Central Nervous System.**—The patient is dull, listless and responds slowly to directions such as "protrude your tongue." There is no retraction of the head, no tremor nor spasticity. There is marked muscle weakness but no paresis. The abdominal, cremasteric and patellar reflexes are present. There is no Kernig nor Babinski nor ankle clonus.

The diagnosis made was that of "acute boracic acid poisoning" with, probably, relapse of typhoid fever explaining the rise of temperature at the beginning of the week's illness prior to the administration of the first boracic acid enema.

**Progress Notes.**—Nine hundred cc. of 5% glucose saline were administered intravenously with improvement in pulse. On the following morning the patient was still very stuporose; the rash did not seem so intensely red; the pulse was 160 and the temperature had risen to 102.5°F. An intravenous of 950 cc. of Ringer's solution was followed by improvement in the pulse, and cardiac stimulants were administered hypodermically. Blood culture on bile was negative. Widal reaction was positive. A dilution of 1:40 showed definite agglutination in three quarters of an hour. The leucocyte count was 9,000 per c.m. Cerebrospinal fluid was clear, colourless and under no pressure. Globulin test was negative (Pandy).

Cells 35 per c.m. (suspected blood cells from traumatism). The examination of the centrifugized specimen showed no acid fast bacilli. No urinalysis was possible because of the frequent incontinence. The blood urea nitrogen was 28. Blood sugar .200 (blood taken 10 hours after the first intravenous injection of glucose solution). Chemical analysis of blood did not show the presence of borates. Temperature continued to rise, at 4 p.m. Tuesday the day after admission reaching 105°, and death occurred at 4.30 p.m.

The autopsy findings were as follows:—

- 1.—Marked injection of blood vessels of mesentery with lymphatic stasis of the mesentery of colon from transverse colon to rectum.
- 2.—Marked post-mortem changes in all organs (autopsy on February 27th).
- 3.—Congestion of both kidneys.
- 4.—Large glands in the mesentery of involved colon. These glands contain haemorrhagic fluid.

The intestinal tube was not opened for examination but was tied off and delivered intact to Dr. Rabinowitch for chemical analysis. After reduction to an ash borates were tested for with negative findings.

#### Conclusions.

The diagnosis of boracic acid poisoning is based upon the history, the incessant vomiting, the stupor, and above all on the presence of a generalized erythematous rash. The autopsy findings of a colitis limited to the lower half of the colon, suggest not only the local effect of the enemata but the usual condition found in death due to metallic poisoning.

My thanks are due to Dr. C. A. Peters, consultant; Dr. Rabinowitch, bio-chemist, and Dr. O'Shaughnessy, for the compilation of the report.

**Some Parochial Stories.**—A small boy I was interested in had committed depredations and covered his childish theft with ingenious untruths. Prior to chastisement I was investigating the matter. A shocked parishioner remarked "I think it all comes of not teaching the children the commandments nowadays—"Thou shalt not steal" and "Thou shalt not commit adultery." I said I did not see how the latter applied to the present case. "Oh, yes," she said, "it does, to adulterate is untruth and it is the same thing."

There was an outbreak of whooping cough in this village and my gardener's children got it. A neighbour advised fried mouse as the best cure; she was using it with her children and they were doing well. She must have cooked her savoury very daintily; the children did not know what they were enjoying but they liked it and demanded more! The smell of the fried mice must have been very beneficial to the neighbourhood, for the children who partook and those who did not all recovered. We had no deaths!

## Retrospect

### THE ETIOLOGY OF SCARLET FEVER

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The association of scarlet fever with streptococci has been recognized for a great many years. Loeffler in 1884 isolated streptococci from throat smears in a series of cases of scarlet fever and suggested this was the causative agent. Marmorek in 1896, and Moser in 1903, used polyvalent antistreptococcus serum for the treatment of the disease. Moser, who found streptococci in the blood of 63% of scarlet fever cases after death, asserted that these were the cause of the disease, just as another strain of streptococcus is the cause of erysipelas, and claimed remarkable results from the use of his antistreptococcus serum. This treatment was never generally adopted on account of the difficulty of obtaining a satisfactory serum and the large doses required. In 1905 Jochmann published a careful article<sup>1</sup> weighing the evidence for and against the etiologic relationship of streptococcus haemolyticus to scarlet fever and stated that "streptococci are indeed the most common and the most dangerous agents of secondary infection in the disease, but are not the true causative organisms of scarlet fever." This dictum was almost universally accepted and it was considered that the real cause of scarlet fever was some unknown organism which rendered the patients more susceptible to streptococcus infection, very similar to the usual explanation of the etiology of epidemic influenza. During the last five years, however, opinions have changed again, and there has been a great deal of recently published work all pointing to the conclusion that a specific strain of haemolytic streptococcus is the actual cause of scarlet fever, and immune sera prepared on the basis of this theory have been put forward, which are claimed to be useful for prophylaxis, diagnosis, and treatment of the disease.

The chief arguments against this theory have always been, first, that scarlet fever is a definite, easily recognized infectious disease, which

always arises from exposure to some other case of the disease, and not from modification of other streptococcus infections; secondly, that scarlet fever develops practically a permanent immunity, presumably from development of some antitoxin body, while all the other streptococcus infections rather induce susceptibility to recurrent attacks. However, this is a matter of degree only, relapses and second attacks of scarlet fever are by no means rare, and there seems no reason why a special strain of haemolytic streptococci should not develop this peculiarity as well as the peculiarities of causing a characteristic eruption and a peculiar type of nephritis.

On the other hand, the arguments in favour of the theory that scarlet fever is due to a streptococcus are gradually becoming overwhelming. Some of the work requires confirmation by other investigators, but, if the recent articles are accepted as sound, we have no alternative but to admit that at last the problem of scarlet fever has been solved.

Briefly stated, the arguments used are as follows:—First, scarlet fever, like other streptococcus diseases is a local infection with systemic manifestations. The usual site of this infection is the throat, but it is common to have it elsewhere, as in wounds or burns (surgical scarlet fever) or in the uterus or vagina (puerperal scarlet fever.) Secondly, cultures of a definite strain of haemolytic streptococci can be obtained from virtually 100% of all cases<sup>2</sup>, from the site of local infection (throat or wounds), from the blood, and from all the complications, *e.g.*, suppurating glands, discharging ears and inflamed kidneys, and from both patients and contaminated milk in a milk-borne epidemic of scarlet fever. Thirdly, this streptococcus differs in certain biologic characteristics from all other strains of streptococci<sup>3</sup>. Fourthly, cultures of these streptococci have been carried through several generations and then have induced the disease in certain animals<sup>4</sup>, and in other human beings<sup>5</sup>. Fifthly, from these cases the characteristic streptococci have been obtained, thus fulfilling all of Koch's postulates. Sixthly, in early cases of scarlet

fever the opsonic index for these streptococci is low and in later cases it is high. Seventhly, there is a positive skin reaction following intradermal injection of a filtrate of the scarlatinal streptococci, which shows susceptibility to streptococcus infection, and which becomes negative after the disease<sup>6</sup>. Eighth, the extinction test of Charleton and Schultz<sup>7</sup>, i.e., the fading of the scarlet fever rash in the vicinity of an intradermal injection of convalescent serum, shows the presence of some immune body in the serum of scarlet fever convalescents, and the same sign may be induced by the serum of horses after artificial infection with scarlatinal streptococci but never by normal horse serum<sup>8</sup>. Ninth, specific streptococci agglutinins are found in the serum of convalescent scarlet fever patients especially if this is concentrated<sup>9</sup>. Tenth, an immune serum may be developed in horses by means of the specific haemolytic streptococcus, which is prophylactic for scarlet fever, may be used for the extinction test, and is curative for the disease.<sup>8</sup> Eleventh, when persons shown by positive skin tests to be

susceptible to scarlet fever, are injected with suitable quantities of a toxic filtrate of the specific streptococcus, they develop a characteristic reaction and afterwards may be shown to be immune to scarlet fever<sup>10</sup>. If these claims or even a majority are accepted, we must admit that scarlet fever is due to a specific strain of haemolytic streptococci; and the high grade of lasting immunity induced by the disease gives strong hopes that an immune serum may be produced which will cause both prevention and cure of the disease.

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**Safe Milk.**—There is less public discussion about "safe" milk than there was a few years ago. Recognition of the importance of milk as a food and of the fact that it has to be carried long distances to market has established the principle that milk sanitation is a necessity. The procedures involved have at length become fairly well "standardized." Foremost are: 1. Prevention of all possible contamination by those handling the milk on the farm and in the dairy and by proper care of the cow. The utmost refinement of this plan is observed in the production of certified milk or its equivalent, produced and cared for under exceptionally sanitary conditions, and constantly supervised and inspected by a medical milk commission. 2. Pasteurization by one of a variety of commercial methods. Its use has greatly increased in recent years. The general tendency is toward the pasteurization of all market milk except the certified milk, and in some large cities it is compulsory. Tuberculosis is the

commonest disease with which cows are affected, and therefore demands particularly careful consideration in connection with milk, although the other possibilities of milk-borne infectious agencies are not by any means negligible. It is pertinent to inquire from time to time, therefore, whether commercial pasteurization conducted, as it must be, on a large scale, actually destroys tubercle bacilli. A careful investigation<sup>1</sup> in a representative American city has shown the presence of these micro-organisms by actual inoculation tests in specimens of the raw milk of average quality delivered to city dealers. It was also demonstrated that pasteurization by the holding process between 142 and 148 F. for thirty minutes destroys the tubercle bacillus in the milk. The commercial process of rendering the milk safe can readily be made efficient; it should never be allowed to fail wherever dependence is placed on pasteurization.—*Jour. Am. Med. Ass.*, Nov. 24, 1923.



## Editorial

### METABOLISM IN DIABETES

THERE has rarely, if ever, been a more striking demonstration to the profession of the value of persistent research than that exemplified in the discovery of insulin. Few disorders have attracted more attention in the past than diabetes. The groping in the dark to which the clinician and the practitioner was long compelled to resort in explanation of the phenomena of this disease is well illustrated in the two letters of Dr. Gregory, of Edinburgh, written in the early years of the last century, giving an old student his views on the treatment of it, while confessing his utter ignorance of the condition he had to treat. A century had to elapse before F. M. Allen, of New York, made a definite advance, securing rest for an apparently overtaxed organ by starvation, followed by a restricted dietary. Now it is the glory of Canada that Canadian research has resulted in discovering a fundamental factor in the treatment of the disease, which, while not a curative agent, can, when regularly and intelligently used, indefinitely prolong the life of, and give the feeling of well-being to, even very severe cases of diabetes the prognosis in which hitherto has been, without exception, of a hopeless character.

The ever increasing volume of literature evoked by the discovery is, to the hard-pressed practitioner who wishes to keep in touch with the development of it, almost overwhelming and, consequently, the perspective of some of the fundamental facts in diabetes may be lost or distorted. It is therefore of service to him to summarize occasionally the results of all the contributions to the subject, and in this connection we desire to direct the attention of our readers to the paper by Professor A. B.

Macallum in this issue of the *Journal*, in which he reminds us that there are problems of fundamental importance in this disease which have yet to be solved, problems which have very practical interest to the general practitioner as well as to the biochemist. In this contribution he emphasises the view that diabetes is a disorder in the metabolism not only of carbohydrates but also, and especially, of fats, a disorder the onset of which in elderly life may be heralded by obesity. The more strictly scientific aspect of his observations is emphasized by the association of obesity with diabetes in the well-to-do amongst the Chinese, Japanese, and, especially, the Hindoos. It may be pointed out here that statistics collected recently by the Eugenic Record Office of the Carnegie Institute of Washington indicate that the diseases most permanently associated with adipositis are diabetes and numerous disorders of the alimentary tract. Obesity is, accordingly, of significance in any explanation of the causation of diabetes.

It must be admitted that there are still many problems in diabetes which must be solved before a complete clinical control of the disease is made possible. Among these are the exact chemical character of insulin and the real part it plays in the living cells. Its rôle is not that of a hormone simply, as Professor Macallum points out, as an insulin-like substance is produced in the yeast cell. With that conception, which would halt progress in the development of further knowledge in this line, set aside, it is the duty of the highly-trained biochemist to attack such problems and carry on the investigation of them even through the long years. The reward may be an ever-memorable achievement.

## LEUKOCYTIC TREPHONES

OUR medical dictionary expands with alarming rapidity; but the least we can demand of fresh additions is brevity, and in this respect Dr. Carrel has not disappointed us. He employs the word *trephone* to describe certain substances which are used by the tissue cells in the synthesis of protoplasm and in the growth of tissues. They differ from hormones, for these stimulate the cells to activity but have no nutrient property. Certain cells and tissues manufacture these trephones, so that we have the conception of some cells producing food materials for others; and this idea is not new, for in Claude Bernard's mind internal secretions were nutrient secretions which prepared immediate principles for cell nutrition. But Dr. Carrel has concerned himself with defining the origin of these substances more closely, and with showing their function in physiological and pathological processes. He has been able to do this more exactly with the help of methods elaborated by himself, whereby he has isolated and maintained pure strains of cells outside of the organism, keeping them in a condition of constant activity. It was found that pure cultures of epithelial and connective tissues so maintained, do not obtain from blood serum the materials necessary for the building up of protoplasm, but require for this purpose certain substances contained in embryonic tissues and secreted by lymphocytes and possibly by other cells. Quite early in the study of these isolated tissues it was found that plasma and serum could not be considered as a culture medium for them, as the cells showed no increase of activity when kept in such fluids. But when embryonic tissue juices were added the volume of the tissues began to increase; extracts of other tissues were also found to promote growth, such for instance, as muscle, thyroid and renal tissues, and leukocytes.

One tissue, however, does not necessarily use the same substances for the building up of protoplasm as another tis-

sue. Epithelial cells and fibroblasts, for example, can be cultivated only in the presence of the embryonic tissue juices referred to. But if lymphocytes are cultivated in such a medium they soon die, after first showing some activity. If they are placed in diluted serum, however, they grow well. These cells, then, can build up protoplasm from some constituents of the serum, but the epithelial cells cannot do this.

Dr. Carrel regards leukocytes as storing within the body these trephones, or embryonic growth-promoting substances. He has shown experimentally that if white corpuscles are cultivated for a few days the serum from such cultures brings about cell multiplication of fibroblasts more rapidly than do the controls; and it is possible to augment this stimulation by adding certain proteins, such as casein. Such effects were also demonstrable *in vivo*, for peritoneal exudates containing many leukocytes, or ascitic fluid with living macrophages, are found to have a marked activating action on the growth of connective tissue.

The white blood cells from this point of view may be thought of as mobile unicellular glands, which transform some of the serum constituents into trephones and set them free in the blood plasma or the lymph in the spaces around the cells, as food for fixed cells: in Dr. Carrel's words, "they play the rôle of trephocytes, or nursing cells, for epithelium and connective tissue." Such a function exists along with that of destroying foreign substances.

Leukocytes, however, may, under some conditions set free substances less beneficial than trephones. Pus, or the leukocyte in disintegration, will depress cellular growth: a wound covered with pus will heal less rapidly or even not at all; and the rate at which a clean wound will cicatrize may be appreciably lengthened by the development of an abscess in another part of the body. So that leukocytes which are dead, or at any rate are

in a state of partial disintegration, may give rise to distinctly toxic products.

At certain times tissues may show an increase in their inherent power of growth, as in the repair of fractured bones, when fibroblasts which have ceased multiplying for varying periods of time, renew their embryonic growth of energy: a phenomenon whose mechanism is not yet clear to us. But Dr. Carrel points out that we have at least come to see from the studies of these pure cultures of cells, that this energy of growth depends on substances in the fluid around the cell, and not on the energy derived from the ovum. He discusses Virchow's view that an inflammatory irritant was responsible for the resumption of cellular activity in such

pathological conditions. That some irritant is necessary for cell growth in the process of healing is evident; a clean wound with no debris of tissue or blood clot, and protected from outside irritation, does not heal. But this irritant factor acts through the medium of the leukocytes, for any mild irritant will cause the invasion of given tissues by white cells, and these by supplying the food material required for the production of new cells, serve to bring up the embryonic reserves of the organism. It is possible, Dr. Carrel concludes, that the growth-promoting properties of leukocytes are utilized by the diseased organism as fully as is their power of opposing bacteria and other foreign substances.

H. E. MACDERMOT

### MALIGNANT DISEASE IN EGYPT

IN an article from the Royal School of Medicine of Cairo, W. Dolbey, Surgeon, and W. Moore, Surgical Registrar of the Kasra-el-Ainy Hospital, present us with an interesting enquiry into the incidence of cancer and malignant disease in general in Egypt, which may throw some light upon the etiology of this disease; especially as the habits and customs of the people are so different from those of England and America, while parasitic intestinal disease exists in so large a percentage of the fellaheen or country people of Egypt. In their report they have analysed all the cases of cancer and malignant disease that have attended this hospital in the last four years. This hospital is one of the largest in the East and has 400 available surgical beds, a yearly in-patient list of 13,000, and a yearly out-patient attendance of 122,000 drawn from all the lower Nile region of Egypt and Soudan. Epithelioma of the scalp is definitely more common than in England and America, a fact which may be explained by the habit of shaving the head, the great incidence of favus, and the intensity of the actinic rays of the sun. Sarcoma of the flat

bones of the skull is also decidedly more common. The malignancy of the sarcoma of the long bones is, however, not so great. An epitheliomatous condition of the jaws is very frequently seen due possibly to the prevalence of dental caries and alveolar abscesses at the present day; an unfortunate condition which appears to have persisted through all the past ages from 3,000 years B.C. to the present day. It is in the digestive tract, however, that we note the most remarkable difference. There is practically no cancer of the stomach in Egypt; only eight cases were met with in three years. Secondary cancer of the liver is also rare, but primary cancer originating in the gall bladder or in the gall bladder fissure of the liver is slightly more common, with ten cases. As to the incidence of gall stones in Egypt, six cases only were observed during this period of three years in spite of the fact that typhoid fever is endemic. The connection between gall stones and the development of carcinoma of the gall bladder would appear to be slight. In the large intestine cancer is very rare in spite of the universal parasitic infections of the

colon. In the urinary bladder, however, the incidence of malignant disease both carcinoma and sarcoma is much more common, due to the irritation of the bilharzia ova in the foul and alkaline bladders with cystitis, but we have seen no case of cancer in a non-inflamed bilharzial bladder. To account for the remarkable difference in the incidence and also in the character of malignant disease in the Egyptian as contrasted with the Northern European, we note that the diet of the fellaheen is almost entirely vegetarian. Meat is eaten once a week only, and goat or mutton is the meat of choice. Cheese, milk, eggs and beans form the most important part of the daily diet. The green tops and roots of vegetables are constituents of nearly every meal. Tomatoes are eaten freely by all, and with onions are a common food. There is no attempt at preservation of the food by smoking, salting or drying in the sun. Malignant disease affecting the bones, skin, skin appendages, appears to be definitely more common than in Europe or America, and may be attributed as far as the skin is concerned, to the irritating action of the actinic rays of

the sun. The progress and development of individual cases of cancer is, as a rule, less rapid, the involvement of glands less marked, and the development of metastases more infrequent than is generally the case in England or America. The almost complete absence of functional nervous disease among the simple fellaheen, and indeed of almost all organic disease of the nervous system has, the writers consider, an important bearing on the development of cancer in Egypt. This relative freedom of the fellaheen from nervous diseases may also serve to explain the absence of exophthalmic goitre and cretinism in a country where simple goitre is common. The industrial revolution of the nineteenth century appears to have passed Egypt by. The only obvious change in the life of the fellaheen during the last 3,000 years lies in the substitution of paraffin as an illuminant for the primitive bean oil. For him there are few uncertainties in regard to seasons. Money to him does not represent a source of credit or even a medium of exchange, and the wear and tear and nervous strain of modern twentieth century life do not affect him.

### THE ACID BASE BALANCE OF THE BLOOD

THE automatic adjustments of the human body have often been an object for envy on the part of laboratory workers who find it difficult from a mass of conflicting forces to achieve a constant result. In whatever direction the balance is disturbed there is a prompt and invincible tendency to return to the physiologic norm as soon as the disturbing influence is eliminated. This has long been evident in the regulation of the body heat but it is only of recent years that it has been shown to apply also to the chemical reaction of the tissues. The exact range of hydrogen-ion concentration of the blood serum is still in dispute. It probably lies between the variations represented by pH 7.3, and pH 7.5. The extreme variations appear to be on

the acid side pH 6.9 and on the alkaline side pH 9.0. Wide variations may occur in the course of disease, and similar variations have been produced experimentally in man. Some remarkable results obtained on himself and colleagues at Oxford and Cambridge were given by Mr. J. B. S. Haldane at a recent meeting of the section of Therapeutics and Pharmacology at the Royal Society of Medicine. Mr. Haldane produced acidosis in himself and in animals by the ingestion of large doses of ammonium chloride, and alkalaemia by similar doses of sodium bicarbonate. After taking forty-five grammes of sodium bicarbonate he found the alkaline reserve definitely increased by 20%, the blood becoming more alkaline and ammonia disappear-



ing from the urine. After taking sixty-five grammes of ammonium chloride spread over a period of three days the alkali reserve was reduced to less than half of the normal. The calcium content of the serum rose by 10%, and the excretion of Na, K, Ca and P was vastly increased. When he took ammonium chloride for any length of time the body weight was found to drop sharply. By hot baths the alkaline concentration of

plasma may be increased considerably; but this result was merely temporary and disappeared as soon as the individual ceased the over breathing caused by the temperature of the hot bath. No evidence has been submitted to suggest that the alteration would benefit the patient. The drinking of saline waters except in larger quantities does not effect any noticeable alteration in the hydrogen-ion concentration of the plasma.

### MENTAL DEFECT IN EARLY CHILDHOOD

THE subject of the symptoms, diagnosis and treatment of mental defect in early childhood was chosen by Dr. John Thompson for the course of the Morrison lectures on Mental Disease, delivered recently in the hall of the Royal College of Physicians in Edinburgh. The clinical material on which the lecturer drew consisted in the notes of 1,200 cases, 952 of whom were under five years of age. He divided his cases into two large groups, (a) primary amentia, in which there is an original incapacity of the cerebral neurons for proper development, (b) secondary amentia, due to an arrested development of the brain from some extraneous or accidental cause. Dr. Thompson's figures referring to younger children are, primary 57%, secondary 43%; a difference in numbers which may perhaps be due to the fact that many cases of primary amentia are not recognised till they go to school, while many of the secondary cases die in infancy. The diagnosis of mental defect must depend upon information given by the mother and upon a careful examination by the doctor. The information received from the mother should cover the story of the confinement, of any miscarriages, of the condition of the other children in the family, and of the family history as far as it can be given. Examination of the skull may in some cases show some abnormality, an abnormally small head or a too early closed fontanelle. Mongolism, cretinism, or

microcephaly should be recognised. Regarding behaviour, unnatural gestures and grimaces, with an unnatural rolling of the eyes, may indicate some mental defect. Lack of natural curiosity, or any abnormal emotional displays are morbid signs. A series of epileptiform attacks without definite cause is generally an indication of the presence of some mental defect or irritation. In dealing with the milder cases prolonged study of the child may be necessary before the extent of the damage can be estimated. In the normally developing child the first aimless movements of the limbs should gradually become purposive as they become stronger. After the first three months he begins to balance his head. Later he struggles to sit up. Still later he exerts his will in learning to crawl, stand, and to walk. A good sign that the baby's brain is developing is the increasing gratification derived from the normal functioning of the various organs of the body. Blindness and deafness greatly interfere in early life with the growth of the intelligence. Memory develops gradually. Instincts and reflexes develop into voluntary actions, and the child's character begins to form. Before he is a year old he should understand much of what is said to him. Control over his reflexes not infrequently develop at the age of a few months; when he begins to sit up, control of his saliva become necessary, and is accomplished, excepting under conditions when

it is temporarily increased from irritation of teeth or gums. Bad habits such as thumb sucking, air swallowing and rumination are of important significance. A habit of constantly protruding the tongue is not infrequently seen in mongols and cretins shortly after birth.

With regard to simple primary amenia, consanguinity and neurotic heredity are important etiological factors. Convulsions are common. Microcephalus, a term often used loosely, is not common but when met with is a primary defect of the brain cells. The mental defect generally varies in direct proportion to the size of the head. Cerebral development in cases of mental defect proceeds very slowly. After the early years of apathy these children often become restless, inquisitive and mischievous. The prognosis both as regards life and mental development is unfavourable. Mongolism was present in 25% of Dr. Thompson's cases under five years of age, and in 45% of those under a year. The mongol has less powers of resistance to infection than the normal

child. Some perversion of endocrine development would seem to be an etiological factor. Dr. Thompson called attention to the striking fact that the average age of the mother in these cases is thirty-seven and one-half years. Thyroid treatment does not seem to be of much value. Sporadic cretinism in Scotland is much less common than mongolism. The diagnosis in doubtful cases can be rapidly settled by the striking improvement which follows the administration of thyroid extract. Dr. Thompson considers that premature babies are more liable than full time infants to intracranial haemorrhages. In diagnosis the history is most helpful, revealing prematurity, a severe labour, asphyxiated condition of the child when born, and damage to the head seen after birth. Mental symptoms are the same as those in other defective babies although they appear worse in children with spastic muscles. Dr. Thompson laid stress on the value of antenatal work in preventing mental defect from birth injury.

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### CHLORINE THERAPEUSIS

SOME of the medical officers in the United States Arsenal at Edgewood, Md., have interested themselves lately in studying the possible therapeutic action of a few of the poisonous gases used in the Great War. Vedder and Sawyer (*Journal of the Amer. Med. Association*, March 8th., 1924) have given us a very interesting account of their investigations upon chlorine as a therapeutic agent in certain respiratory diseases. They say that there is an old tradition in this arsenal that no operative in the chlorine plant was attacked by influenza during the epidemic; and that employees in chlorine-making plants regarded themselves as relatively free from respiratory diseases. There is to-day little doubt that almost all our types of colds (so-called) have an infectious etiology. This does not mean that

microbial agencies are present in the affected mucous membrane only when the inflammatory reactions give signs of their activity; on the contrary it is generally known that the etiological organisms may be dormant in the mucous membrane of the nasal passages until an opportunity arises to permit their development. There is, therefore, much interest in the report of Vedder and Sawyer that the inhalation of chlorine gas in weak concentration for one or more hours has a distinctly curative value in common colds, influenzal conditions, and in other respiratory diseases in which the infecting organisms are located on the surface of the mucous membranes of the respiratory passages. Experiments have shown that the chlorine concentration necessary for killing bacteria was within the limits of safety for inhalation

by human beings. It has also been shown that the bactericidal action of inhaled chlorine is greater in the nasopharynx than upon agar plates because of the solubility of chlorine in the moist fluids of the respiratory tract. Its action however appears to be superficial, and inhaled chlorine is not sufficiently penetrating to sterilize deep seated infections. Patients have been placed in more or less air tight chambers and the chlorine vapour inhaled for about an hour in a concentration of 0.015. The results indicated that such inhalations have a very definite therapeutic value of chlorine in coryza, acute and chronic

laryngitis and bronchitis, whooping cough, and influenza. The writers state that chlorine treatment will completely abort a cold when taken sufficiently early, and in well developed cases affords great relief. They consider it also effective in the treatment of influenza, and very decidedly so in the case of whooping cough. If corroboration of their work is forthcoming, chlorine gas will become a valuable adjunct to our therapeutic agents in the treatment of respiratory infections which in several forms are only slightly responsive to internal medication.

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## Editorial Comments

### THE FINANCIAL PAGE

Attention is drawn to an innovation appearing in this issue, i.e., the Financial Page. Arrangements have been made with an investment house of good reputé and wide experience to furnish the *Journal* with monthly contributions bearing upon the problems of investment.

It is superfluous to mention that the medical profession is notorious in providing easy prey to unscrupulous or over-enthusiastic salesmen of "unsafe securities," to use a term of contradiction.

We desire our members to realize that the Association aims for the betterment of the profession in every particular and we offer this service in the hope that it will prove of interest and advantage to our readers. A. T. B.

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### PENAL INSTITUTIONS IN NOVA SCOTIA

We have received a copy of the Annual Report on Penal Institutions of the Province of Nova Scotia for the year ending September, 1923. The province has been watching the progress of attempts made in other provinces towards improving the methods of dealing with prisoners. Attention has been directed in particular to the establishment of prison farms. These have been found very satisfactory, and, in the opinion of the National Committee for Mental Hygiene, would probably give equally good results in Nova Scotia. But during the

past year, "no further action has been taken and it is not possible to report any occurrence which indicates the prospect of an early departure from the old system."

The report goes on to say that this procrastination has had the further effect of deterring the various municipalities from undertaking even necessary repairs, because they have felt that the money so spent would be wasted if additional costs in connection with prison farms had to be met. "So that, where there had been unhealthy or unsanitary conditions, due to faulty construction of obsolete equipment, no attempt has in many cases been made to remedy these defects. Where there were no arrangements for the proper classification of prisoners, this condition still persists and the convicted and the suspect, with, possibly, an insane person awaiting transportation to the Nova Scotia Hospital, are all subjected to the same conditions. The fact that improvement might in a few years be undertaken is for the present acting to make still more deplorable the conditions which have already in the past evoked unpleasant criticism."

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### DEATH RATE FROM DIABETES

The *Statistical Bulletin* of the Metropolitan Life Insurance Company for February brings out the interesting and encouraging fact that

there has been in 1923 a definite though small decline in the death rate from diabetes. The decline is 6.4 per cent., but small as this is, it may have great significance; for it follows a period of three years during which deaths from diabetes had been increasing continuously and at a considerable rate. This decline is contemporaneous with the beginning of the more or less general use of insulin, but we must be cautious in assuming that this treatment is directly responsible. More figures, showing further declines, as well as greater declines, must be shown.

So far, in 1924, the figures continue to be encouraging, and if the decline in January persists at the same rate throughout the year, the fall in the death rate will be more marked than that noted in 1923.

#### THE CONQUEST OF PELLAGRA

Less than a decade has elapsed since Goldberger and his associates began their studies of pellagra in this country. If pellagra was due to an infection as was thought possible by the profession at that time, the introduction and enforcement of sanitary measures to prevent its spread were by many deemed to be necessary; measures for complete isolation of those affected with it were adopted in some instances. Owing to the investigations and carefully collected data by the experts of the American Public Health Service in more than 700 persons affected these severe measures of isolation have been abandoned. The modern view of pellagra is that it is a disease of malnutrition and may be prevented by alteration of the diet. Dietary tables in institutions wherever necessary have been modified by reduction of the maize element and an increase in fresh animal protein foods; meat, milk, eggs and legumes. More recently Goldberger and Tanner have treated cases of pellagra with fresh beef as the only known therapeutic element in the diet, and they state that in every case improvement followed the inauguration of this beef treatment. The preventive value of milk was similarly tested in a state sanatorium. On supplementing the basic diet with about 40 ozs. of butter-milk no one developed pellagra during the period of observation lasting one year. Fresh butter and cod liver oil given daily failed to

prevent its development. The primary etiological factor in this disease, as these investigators point out, seems to be a faulty protein mixture, a deficiency in some unrecognized dietary complex, or a combination of these. It is now believed that pellagra may be prevented completely by dietary changes and the supposition that it may be infectious has died out.

#### CO-OPERATION BETWEEN ALBERTA MEDICAL ASSOCIATION AND COLLEGE OF PHYSICIANS AND SURGEONS

We note that there is a new co-operative arrangement between the Alberta Medical Association and the College of Physicians and Surgeons of Alberta, by which \$15.00 of the combined fee goes direct to the College and the other \$10.00 to the Canadian Medical Association. The latter fee carries with it an annual subscription to the *Journal*. The Canadian Medical Association has offered the medical men of Alberta the services of five different speakers from the east who will give lectures and clinics in each of the five different centres of the province during 1924, if, in return, 400 Alberta men become members of the Canadian Medical Association.

The Alberta Medical Association is to be congratulated on its efforts to arrange the meetings of the Associations of the four western provinces in consecutive order, so that visiting men of eminence may visit each in turn. In this way all would derive benefit from such visits, and the expenses would be greatly lessened by being divided between the four Associations. A great deal of work has been done towards attaining this object, and it has now been arranged to hold the meetings of the four Prairie Provinces in such an order following the meeting of the Canadian Medical Association in Ottawa, in June, as may permit the speakers from that meeting to visit the four western conventions consecutively.

We note that an interesting experiment has been made in medical publication by the Oxford University press acting in conjunction with Messrs. Lier and Co. of Milan. They have produced in photographic facsimile the ex-



tremely rare and finely illustrated folio first edition of the *Fasciculus Medicinæ of Johannes de Kethum* printed at Venice in 1491. This edition which had a larger page than any of the subsequent issues is historically important as representing the turning point for medicine from the middle ages to modern time. Beside the facsimile of a remarkable work, the volume before us contains an elaborate account of its sources and affinities, written by Professor Karl Sudhoff of Leipsic, and adapted for English readers by Charles Singer. Of the

series of fourteen plates drawn from manuscript material, eight have been coloured by hand. Should this beautiful issue of a remarkable work prove successful the proposal is to produce a whole series of facsimile medical works. The ten earliest 15th century tractates on syphilis are almost ready, and other volumes have been planned. The series which is entitled "Monumenta Medica" is under the general editorship of Dr. Henry Seigrist of Zurich. It might be well for our Canadian Medical Libraries to obtain each a copy.

#### **Intra-Arterial Injection of Sodium Iodid.—**

Clinical experience has convinced Barney Brooks, St. Louis, that intra-arterial injection of a solution of sodium iodid, and roentgen-ray photography constitutes a valuable method in the diagnosis of circulatory diseases of the extremities. The solution injected is prepared by dissolving 100 gm. of sodium iodid crystals in 100 c.c. of distilled water. The solution is sterilized in the autoclave and is always used soon after its preparation. Three typical cases are cited. From these and other clinical experiences and numerous animal experiments, this method has been found to give valuable information as to the location and extent of arterial obstruction. In those instances in which the method has been used, there has been no manifestation of injury to the artery from the injection. An exact knowledge of the site and extent of occlusion of the arteries of the extremity is of great value in the prognosis and treatment of diseases of the extremities due to deficient arterial blood supply. The application of the method described by Brooks is said to have been of great value in determining the necessity of amputation in instances of peripheral gangrene, and in those instances in which amputation was indicated in determining the site at which the amputation should be done. It has also, in several instances, established the fact that conditions presumed to be due to arterial obstruction had other causes. Also, in cases of arterial obstruction it is possible to obtain valuable knowledge as to the site and extent of the collateral circu-

lation. Further experimental and clinical work is in progress.—*Jour. Am. Med. Ass.*, Mar. 29, 1924.

#### **Arteriosclerosis in Thyroid Deficiency.—**

Arthur M. Fishberg, New York, asserts that various anatomic, experimental and clinical findings point to loss of the thyroid secretion having among its consequences injury to the vascular system. This connection seems to be definitely demonstrated in the case reported by him. The patient presented two seemingly discrete symptom complexes, an anatomic equivalent for each being found at the necropsy: 1. A hypertensive syndrome with a diastolic blood pressure of 135, cardiac hypertrophy and cerebral hemorrhage; corresponding to this there was found at the necropsy generalized arteriosclerosis and beginning primary contraction of the kidneys. 2. Sudden onset of adiposity of a peculiar distribution with retardation of skeletal and more particularly genital development, as well as abnormal distribution of hair. These phenomena point unequivocally to an endocrine disturbance, and at necropsy there was found a very extensive atrophy of the thyroid gland, with no other evident anomalies of the endocrine organs. In this case not only were the larger vessels atheromatous, as in the ordinary senile arteriosclerosis, but also the arterioles in the various organs were thickened.—*Jour. Am. Med. Ass.*, Feb. 9, 1924.

## Men and Books

## DIABETES A CENTURY AGO\*

EDINBURGH, Sat. 19th, of Jany, 1811.

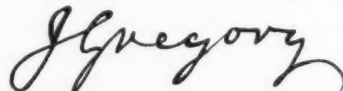
Sir,

I wish I knew a cure for the diabetes but I really do not. I have now seen or been consulted by about thirty-five patients labouring under it (including your young friend).

To the best of my knowledge and belief not one of the thirty-four was cured permanently. One seemed to be cured, and was to all appearance well for some weeks, but in less than three months relapsed and soon died. I believe that *all*, and I am sure that all but a very few of them died exhausted with their disease. Most of them lingered long. The diet of animal food with as little vegetable as possible so strongly recommended by Dr. Rollo has been twice tried in vain by other practitioners. It certainly affords very little saccharine matter and thereby makes the urine less sweet than it was before, and lessening the quantity of the drink proportionately less copious. But neither or both of these things implies a cure of the disease. The large and repeated bleedings recommended by Mr. Watt of Paisley have not succeeded with others. Nevertheless you may try them if you please. Or if you will take the trouble to tell me the particulars of his case I will gladly tell you what I think of it and what I would do if he were my patient. Your expression (a violent attack of *diabetes mitior*) is not sufficiently precise to enable me to judge of his situation. I do not know whether by *diabetes mitior* you mean the diabetes mellitus (with the sweet urine) or the diabetes insipidus with the very watery or slightly saline urine. *Diabetes mitior* is not one of our nosological phrases. Tell me particularly your patient's age, stature, temperament (sanguine or melancholic), habit of body (fat or lean); does he waste in flesh and strength? do his legs swell? is he hectic? is his pulse quick? does he sweat

in the night or towards morning? or is his skin always very dry and parched? Has his breath a faintly acid smell? or are his gums red and swelled as if he had been taking mercury? Is his appetite voracious or moderate? How much food thick or thin does he commonly take in twenty-four hours? Is his thirst very urgent? What does he drink? How much does he drink? What does he eat? What were his former habits as to eating and drinking? What quantity of urine does he void in 24 hours? Is his urine sweet? On evaporating an English pint of it to the thickness of treacle, how much of that sweet residue is obtained? Is the serum of his blood sweetish? Is it whitish? Has the crassamentum a fluffy coat? Does the blood keep long—a week or two, or three without putrefying? Take two cups of blood from his arm (10 ozs.) and observe all these things and tell them to me. The case is interesting and curious. It looks like diabetes from a local affection of the kidneys, the effect of the fall from his horse, which first produced the haematuria.

Yours most truly,


EDINBURGH, Sat. night, 23rd February, 1811  
Sir,

I am very sorry and indeed much ashamed that I have been so long of answering your letter of the 3rd of February. The truth is, at the time when I received it, I was plunged into such sad arrears of professional letter writing and had so little time for it, that it was literally not in my power for several days to answer it and many other letters on cases still more urgent than your friend's. It unluckily fell aside and escaped my memory, and indeed my sight, till this day that I found it on clearing out my desk.

I wished I could make up for my long delay in answering your letter by giving you a good theory of diabetes and by recommending to you a successful practice in that commonly obstin-

\*Letters written by Dr. James Gregory, Professor of Medicine, University of Edinburgh (1753-1822) expressing his opinions on the treatment of diabetes. These letters were sent to us by Dr. Beaumont Small of Ottawa. The owner has a certificate of attendance by Dr. Christie of Nairn on the lectures given by Dr. Gregory. Dr. Gregory was the originator of Gregory's powder. (Ed.)

ate incurable fatal disease, but unluckily I can do neither the one nor the other of these things. I have no satisfactory theory of diabetes. All that I have seen are hypothetical and visionary. At best they are imperfect, unsatisfactory, and scarcely applicable in practice, and what is worse *no specific* nor any very powerful remedy for it, has yet been learned by experience. It appears (or at least it has been said) that the diabetes, even after it had continued for a long time and gone to a great degree, has gone off entirely, at least for a time, by the unassisted efforts of nature. Sometimes it seems to have gone off when remedies were used which were intended and were supposed to remove it:—as in the case of Captain Meredith and others described in Dr. Rollo's great book about the diabetes, and in Watt's book on the same disease, and in one patient of my own; but in most all of those cases the cure whether spontaneous or artificial was not complete or permanent. The disease generally returned, in some patients very soon and repeatedly, and at last was fatal. The remedies at first supposed to have done much good afterwards were found to do little or none, even in the same patients, and were completely unsuccessful when tried on others.

I see no encouragement to try Mr. Watt's method (bleeding) any further with your friend, and there are strong reasons against it. I can by no means promise you success by the use of Dr. Rollo's animal diet, but as it will certainly afford less saccharine matter than vegetable or common mixed diet, it is worth while to try it fairly. It may do good. Keep your patient on the smallest possible allowance of biscuit, dry toast or stale bread. Allow no fresh vegetables, broths, fruits, sugar or fermented liquor. Let him live as fully as he pleases on beef tea, chicken broth or soup (without vegetables) fish, fresh meat of all kinds, but rather stale than fresh, and rather fat than lean; blood puddings, suet, butter, eggs, cheese and milk. For drink, lime water with a fifth part of milk in it, or water with a

small portion of *sulphuretum potassae* (olim *hepar sulphuris*) to make his drink unpleasant to him that he may take but little of it. For medicines let him have *pilula aloetica* or *oleum ricini* freely to keep his body open. Try him two or three times for two days each time with the *pulvis ipecacuanha et opii* (*grana V tertiâ quâque horâ*) to bring out and to keep out a good sweat. Try to favour this by means of fomentations moist or dry, and a good allowance of weak spirits and water without sugar or lemon juice. Try him fully with the *pulvis sulphatis aluminae compositus* or the simple alum in powder, whichever you please, in doses of 2 scruples to 2 drachms three or four times a day. Try also with him at the same time that you give him the alum, the expedient of anointing his whole skin from head to foot every night and morning with the *unguentum simplex*. This anointing and the very free use of alum seemed to succeed upon a hospital patient of mine about twenty years ago, the first patient I ever had in diabetes. He was in the last hopeless stage of it, with hectic fever, swelled legs, great emaciation and debility, urgent thirst, voracious appetite, taking food at one time fourteen pounds, drink twenty-four pints during the day. He got rid of his hectic fever, his swelled legs, his insatiable thirst, his ravenous appetite, and recovered his flesh and strength. His urine gradually came down from 24 to 4 pints a day (this in April) and then suddenly changed from saccharine and inodorous to strongly alkaline and fetid. He was quite well when he left the hospital, and had been so for ten days; he continued so for six weeks afterwards, then relapsed and died before the end of the year (1782). I heartily wish your patient more permanent benefit from the same or from any other practice, and beg to know the result in his case.

I have the honour to be, Sir,

Your most obedient servant,

*J. Gregory*

## Correspondence

## INTRA-BRONCHIAL PRESSURE

To the Editor:

You have been so kind as to forward to me Dr. Rudolf's letter appearing in the last issue, and have invited me to make some reply to Dr. Rudolf's technical criticism.

Upon further consideration of the question, and after looking up the physiology of intra-bronchial and intra-thoracic pressure I have nothing to do but to admit the force of Dr. Rudolf's criticism, which I do with pleasure, and none the less so considering the very kind expressions with which Dr. Rudolf accompanies his remarks.

And yet, when one considers the pathology of bronchiectasis; when one remembers the character of the bronchial dilatations seen in that disease, dilatations which sometimes resemble the saccular form, sometimes the fusiform variety, such as one finds in aneurysms, one can not get rid of the idea that such dilatations must have been produced, in part at least, by back pressure. This is, of course, the current idea; and the only suggestion I can make in favour of the contention that a rise in intra-bronchial pressure is in some part the cause of the bronchial dilatation is that of a local obstruction in a bronchiole, or even in a bronchus, such as would be caused by an accumulation of mucus which opposes the sudden out-rush of air, belonging to the act of coughing, and in that sense might distend the bronchiole lying distal to such a plug. In the act of coughing there is first a full inspiration; then the glottis closes; then the chest wall and the diaphragm are brought into sudden muscular contraction. This sudden diminution of the thoracic space results in a driving out of the air contained in the lung. It is true that under physiological conditions, the lung and air passages being normal, a pressure of this sort generally applied from the periphery, could not raise the intra-bronchial pressure any more than the extra-bronchial, or general intra-thoracic pressure, as Dr. Rudolf points out. But if one takes any small area of the lung, in which the contained air is prevented by a plug of secretion,

or by a possible inflammatory kinking, from its free passage out through the trachea, then it seems to me conceivable that the bronchioles of that particular area might be dilated by the pressure imparted to the air contained in that particular section of lung. The physiological conditions of the normal animal can perhaps hardly be applied to pathological conditions. The development of bronchiectasis after the swallowing of a foreign body seems to me a very good instance in point. There we have a quite definite local corking or plugging action, and the distension of the bronchial tree behind this cork would seem to be the natural result of a rise in intra-bronchial pressure confined to the area blocked off. Of course infection, after all, is the most important factor; otherwise a block of a bronchus only leads to an aseptic collapse of the area of lung served by that bronchus, as has been well shown by Scrimger in experiments looking to the elucidation of the problem of massive lung collapse.

In conclusion may I express my appreciation of Dr. Rudolf's letter, and my thanks for bringing this interesting point to the attention of *Journal* readers.

Yours sincerely,

EDWARD ARCHIBALD.

MONTREAL, April 16, 1924.

## PREVENTION OF GOITRE

To the Editor:

May I very respectfully suggest that a general campaign of education of the public and the medical profession on the matter of prevention of goitre, similar to that carried on concerning the early diagnosis of cancer, might very properly be undertaken. The possibility of cure even in favourable, early cases of cancer is not nearly as great as in similar early cases of goitre. In the latter, cure can be effected in most cases under the age of twenty-one.

But the great good that can be done is in the matter of prophylaxis. In the case of cancer, owing to the lack of knowledge, little can be done. But in the case of goitre, in spite of



the absence of accurate, sure knowledge, enough is known of prophylaxis that goitre can almost surely be prevented if perfectly simple and well known measures are undertaken.

That many seriously goitrous districts exist in Canada is known to individual doctors and to the people we sarcastically call "the laity." There should be a map of these districts just as a map shows the physical contour of the surface of the earth, the gold producing areas, the coal beds or what not. The people in these districts should be taught how to prevent goitre just as well as how to prevent fires or weeds in the grain.

In at least one section of Ontario they cannot raise little pigs unless they feed the breeding sows on "goitre medicine." In that same district many humans, dogs, and other animals also have goitre. If we once get the Department of Agriculture interested in making pig-raising profitable in such a district, the Board of Health will at least follow suit.

Yours respectfully,

JASPER HALPENNY.

WINNIPEG, March 20, 1924.

#### THE MANUAL REDUCTION OF STRANGULATED HERNIA (TAXIS)

To the Editor:

Dr. Archibald Stewart's frank publication of a fatal case of strangulated hernia reduced *en masse*, in the March issue of the *Journal*, should certainly rouse our teaching surgeons to a more vigorous denunciation of taxis. The danger of this procedure cannot be overestimated. The writer has operated on two

cases of hernia reduced *en masse*. In both cases a mass was palpable above Poupart's ligament. One of the cases had a fatal outcome. There is no doubt that surgeons of long experience could confidently recount many another case.

In the writer's opinion, taxis should be deleted from modern surgical teaching. Putting the patient in *high Trendelenburg* with the foot legs of the bed resting on the seats of two chairs or in hospital putting the bedside cupboard under the foot of the bed (the usual elevation of the foot of the bed is useless), flexing the thigh with two pillows under the knee and internally rotating it, putting an ice cap over the hernia to keep down oedema and giving the patient  $\frac{1}{4}$  grain of morphine to keep him quiet, will reduce almost all strangulated inguinal herniae by a gentle gravity pull from the inside. This age old treatment emphasized by Lawrie McGavin is still the safest and best. Any hernia which is not so reduced should certainly not be manipulated, lest reduction *en masse* occur.

When one recalls that seldom at operation can a real strangulated hernia be reduced through the narrow constricting neck of the sac before the neck is divided, the futility of external manipulation is apparent.

Taxis comes from a Greek word meaning "arrangement." All that can be said of its "successful" operation in strangulated hernia is that it is the arrangement of the hernia so that it lies out of sight, and leads the doctor to go home hoping all is well, when it may be far from well.

NORMAN M. GUIOU.

OTTAWA, March 18, 1924.

**Phenoltetrachlorophthalein Liver Function Test.**—Because Piersol and Bockus, as well as others, have demonstrated that the appearance time of the dye in the duodenal tube is proportional to the total amount of dyestuff excreted in two hours, George Howard Toxie, Kansas, City, Mo., tried to use this appearance time as the criterion for his tests. He has tried to compare the results obtained in this way with those of the Rosenthal method of withdrawing blood from another vein and examining it for the dyestuff. This report covers 164 tests on 135 patients. Patients were selected for the tests

whose symptoms indicated a possibility of trouble in the right upper quadrant and, therefore, includes patients with whom the final diagnosis showed such conditions as pyelitis, cholecystitis, duodenal ulcer and hepatitis. The results obtained indicate that one test by the duodenal tube is not sufficient to give conclusive evidence as to the condition of the liver and biliary functions. On the other hand, repeated tests do seem to give figures which indicate the relative efficiency of that apparatus.—*Jour. Am. Med. Ass.*, Feb. 2, 1924.

## Abstracts from Current Literature

### MEDICINE

#### Time for Operation in Ectopic Gestation.

Wilton, T. S. *Amer. Jour. of Obst. and Gyn.*

The systolic pressure may be taken as a guide to the condition of the patient with ectopic pregnancy, and is an indication as to the time for operative measures. The unruptured type does not alter the pressure. In the ruptured type there is a decline of pressure to between 90 and 80, or even lower, accompanied by shock. Declining pressure should be averted by heat, salines, morphine and abdominal compression, etc. When the patient improves, and the systolic pressure returns to 115, not more than two hours should be allowed to elapse before abdominal section. In the moribund types pressure does not return to more than 50, at which point operation may be undertaken. Decline of pressure in any type of ectopic is a grave sign, making immediate operation imperative.

In the discussion on this paper Dr. W. W. Babcock recommends vaginal route for operation in the severe cases, puncturing the vault, seizing the ruptured tube and clamping. If the patient's condition warrants it, ligation and removal is done; otherwise it is enough to simply pack loosely and return the patient to bed when the condition of shock can be treated. Removal of the clamped tube may be undertaken when the patient has improved.

A. D. CAMPBELL

#### Results of Treatment in Syphilis of the Nervous System.

Fordyce, J. A. *Jour. of Derm. and Syph.*, Feb., 1924.

Speaking as a dermatologist, Dr. Fordyce admits that usually syphilis of the nervous system is regarded as a neurological problem mainly, but his paper is rich in the fruits of experience and reflection, and covers the fields of both specialties.

He remarks that "fully twenty-five per cent. of all syphilitics present clinical or laboratory evidence of involvement of the nervous system in the first year of infection." This is somewhat at variance with the teaching that the nervous system can be infected at any time dur-

ing the persistence of the disease. Examinations of the spinal fluid at an early stage, and again after completion of the treatment should be the main evidence on which to base such a conclusion. Careful clinical observations, indeed, will often show that symptoms which have apparently developed late—ocular palsies, bladder disturbances, etc.—actually were present in varying degrees much earlier in life. They may have subsided under treatment, only to reappear later, and in a more severe form.

He has followed several cases from the early days of their infection, when the nervous system was obviously involved, until the development of typical tabes and paresis twenty years later. In similar cases, however, where modern therapeutic measures have been employed and controlled by examinations of the cerebrospinal fluid, there have been cures without relapses.

There is much clinical evidence also of the persistence of visceral and cardiovascular lesions with only slight tissue reactions, and also of recurring attacks of keratitis in congenital syphilis. Both experimental and clinical evidence support the view that there exist familial types of neuro-syphilis in which there are strains of organisms possessing rapid invasive powers.

Either the early infection of the nervous system is cured and invasion occurs again later on, or else the earlier types of disease are developed from the original infection, in spite of treatment. He is convinced from clinical observations and laboratory tests that in the majority of such cases the infection has never been thoroughly driven out of the nervous system, in spite of negative Wassermanns. The reason for failing in this lies chiefly in not following the spinal fluids thoroughly enough. Certain types of both late and early neuro-syphilis are curable by continuous use of salvarsan intravenously, but in others combined intraspinal and intravenous injections are necessary. He holds that intraspinal therapy was never intended to supplant routine treatment, but rather to supplement it in reaching the infection in its most inaccessible region,

and to this extent the method is a useful adjunct; indeed, in certain cases it is the only hope of relief.

Dr. Fordyce is insistent that the physician who treats syphilis should have enough neurological training to enable him to recognize the signs and symptoms of nervous involvement. Lumbar puncture must not be limited only to cases with obtrusive signs. He realizes laboratory tests are not infallible, and despite their evidence to the contrary spirochaetes may yet remain in the central nervous system, especially in such types as the purely vascular, the gummata without meningeal involvement and epilepsy of luetic origin. In general, however, the spinal fluid unmistakably reflects pathological conditions in the central nervous system. It is one thing to point out the frequency of early neuro-syphilis and to prove that it is most responsive to treatment at an early stage, but to establish its presence is another and more difficult matter. Dr. Fordyce thinks that the number of cases of this kind is much greater than statistics show, for these fail to take account of the minor types, which may long remain stationary or only gradually progressive. In general paralysis remissions of long duration are achieved which are more striking in patients with a pronounced meningeal reaction. Cures cannot be attained by any existing treatment.

Those specially interested in dermatology showed that they well understood the importance of bearing in mind that the skin manifestations were often accompanied by infection of the nervous system. The work of Dr. Fordyce was welcomed as helping to do away with the heresy that neuro-syphilis was increased by more active treatment.

H. E. MACDERMOT

**The Technique and Reaction of Intra-cranial Mercuric Bichloride Injections.** Keegan, J. *Jay. Brit. Jour. of Ophthalm.*, Nov., 1923.

Cisternal puncture has been used in about twenty cases and has been shown to be comparatively simple and safe. This site is chosen as it is the least difficult place of entry into the intra-cranial cerebro-spinal fluid space and also as the drug enters a point in the cerebro-spinal fluid circulation as near as possible to the optic tracts.

The ordinary lumbar puncture needle is inserted in the neck directly over the prominent spine of the second cervical vertebra. It is directed upwards in the mid-line at about 45 degrees and is felt to pierce the dense occipito-atlantal ligament between the occipital bone and the first cervical vertebra. It enters the cerebro-spinal fluid space in the angle between the cerebellum and the medulla, called the cisterna magna, at a depth of 4 to 6 cm., the depth varying slightly with the thickness of the neck. A guard is placed on the needle to prevent plunging.

About 25 cc. of fluid is removed by syphonage, 10 cc. being saved for examination. The solution of mercury (3 to 5 drops of 0.5% solution) is added to the remainder and this is allowed slowly to re-enter the cisternal space.

There is an almost immediate reaction of severe occipital and frontal headache with nausea and vomiting and symptoms of moderate shock. All the cases have recovered enough to leave the hospital within twenty-four hours.

S. O. McMURTRY

**Intra-cisternal Injections in the Treatment of Luetic Optic Atrophy.** Gifford, S. R. *Brit. Jour. of Ophthalm.*, Nov., 1923.

The author takes the view that luetic optic atrophy, instead of being a simple atrophy due to toxins produced by syphilis elsewhere in the body and progressing to blindness in nearly every case, is a secondary atrophy due to the changes of late syphilis elsewhere in the system, and is the result of the presence of spirochaetes, with consequent infiltration, in the nerve itself.

Although masses of spirochaetes such as are found in the cortex in paresis have never been found in the optic nerve, he bases his conclusion on the work of Stargardt and others who consistently found localized foci of active luetic inflammation at some point in the nerves themselves or in the visual tracts, and on the results of treatment, in a series of six cases of luetic optic atrophy, by intra-cranial injections of mercuric bichloride.

If an active luetic process is at work it may possibly be stopped if the spirochaetes can be killed, and though some fibres already injured may go on to complete degeneration, those which remain should survive and even improve with an

absorption of infiltrate. Treatment must be begun early. Careful ophthalmic examination, especially of the visual fields, in cases of suspected neuro-syphilis or of leutic muscle palsies is of great importance.

As has been shown to be true in tabes and paresis, so in optic atrophy the organisms must be assumed to be ensconced in the nervous parenchyma where drugs given by vein can hardly reach them in effective concentration. Nor can a much greater degree of success be claimed for the other methods such as intensive use of salvarsan; intra-spinal injections of salvarsan and of salvarsanized serum; intra-spinal injections of salvarsanized serum followed by saline under pressure; Behr's method of draining the spinal fluid at intervals during intravenous salvarsan treatment; Goebel's, who attempted to produce a concentration of the drug in the region of the nerve by applying intermittent suction to the globe; and Beriel's, who injected mercury directly around the nerve with a long needle.

The author uses the method of Dr. Geo. F. Suker of Chicago, that of direct injections of mercury bichloride into the basal cisterna with a view to reaching the meninges and pial septa of the nerve by the shortest possible route. From three to four injections of 1-50 grain of mercury bichloride are given at intervals of ten days to three weeks, this being combined with the usual general treatment.

A series of six cases is reported, with improvement in vision in five; while several have apparently been brought to a standstill with useful vision for periods of one to two and a half years.

S. O. McMURTRY

### PAEDIATRICS

**Tuberculosis of the Tonsils and Adenoids.**—A clinical and Roentgen-ray study of fifty cases for five years after operation. MacCready, P. B. and Crowe, S. J. *Am. Jour. of Dis. of Children*, February, 1924.

Since 1912 all tonsils and adenoids (3,260 cases) removed at operation in Johns Hopkins Hospital have been studied histologically. This examination showed tuberculous tonsils or adenoids in 136 cases. Ninety-two of these patients had no other evidence of tuberculous

infection; in the remaining forty-six there were tuberculous cervical glands. Of these ninety-two cases, fifty have been studied by roentgenogram, forty have been followed for a period of five to ten years, and the remainder for two years. Only two cases showed, after operation, tuberculosis of the cervical glands, and both recovered. Only three cases, all children, developed enlarged mediastinal glands, judged by x-ray; these all subsided, and the children are perfectly well. Five patients developed pulmonary tuberculosis, and recovered. Two patients developed tuberculosis of the bones or joints and were improved by surgical treatment. Eighteen cases had tuberculous cervical adenitis before operation; of these, thirteen showed tuberculosis of the mediastinum or lungs by x-ray, two had progressed to manifest clinical pulmonary tuberculosis of which one died. In all of these eighteen, the indication for tonsillectomy was evident tuberculous cervical adenitis, and all the tonsils proved tuberculous on histological examination.

The authors conclude that tuberculosis of the tonsils is usually a bovine bacillus infection, which is found, in half the cases, in children under ten years; there is frequent glandular involvement, with infrequent pulmonary and intestinal complications and the physical condition of these children appears excellent. Because the infection is already widespread in the cervical and mediastinal glands and because so few patients progress to clinical tuberculosis, it is not wise to alarm the family of the patient by labelling them tuberculous. They consider either the anaesthetic of choice and believe that latent tuberculosis of the tonsils, cervical or mediastinal glands is no contra-indication to its use. There were no post-operative lung abscesses in the series and only three cases of post-operative pneumonia, with recovery.

There is an extensive review of the literature in the early part of the article. R. R. STRUTHERS

### SURGERY

**The Surgical Treatment of Unilateral Pulmonary Tuberculosis.** Archibald, Edward. *Amer. Jour. of Surg.*, February, 1924, vol. xxxviii, p. 17.

Archibald refers to the original operation of



Friedrich, who removed practically the whole bony thorax on the affected side. The immediate mortality of thirty per cent. was so high that it led to a more modest removal of ribs. At the present time from 4 to 16 cm. are removed of all ribs, from the first to the eleventh inclusive, at their posterior ends. The chest cavity is diminished by approximately fifty per cent. and perhaps a more important result is that breathing on the affected side is almost abolished and the lung is given rest. These two factors, compression and rest, are capable of bringing about a most surprising degree of improvement, and even "practical cure." Toxaemia, above all, is frequently extraordinarily lessened, probably by interference with lymphatic flow and absorption. Cavities may be collapsed and ultimately heal. Fever, cough, and sputum gradually disappear, and the general sense of well-being is much increased. Such are the results in the good cases.

The expert in the treatment of tuberculosis must be consulted, since he can best forecast the outlook without operation and the resistance of the patient. The disease must be unilateral; the most favourable cases are chronic ones with general contraction of the affected side of the thorax.

Archibald has always performed the operation in two stages, and has used the combination of gas and oxygen and novocaine. The patient is prepared for operation with morphine and atropine. He has had only one death directly due to the operation in thirty-nine posterior thoracoplasties.

The results in thirty-seven cases are analyzed. Ten have died from various causes; five are cured; ten are greatly improved; five are moderately improved; one is stationary; one has not been heard from; and four have been operated upon too recently to give an opinion.

Archibald concludes as follows: It seems fair to say that this operation has won for itself an assured place in the treatment of selected cases of pulmonary tuberculosis. It represents a very real landmark of progress. It can not be doubted that there are at this moment thousands of cases in this country who might be enormously benefited by operation. Those in charge of sanatoria throughout the country are rapidly appreciating its value and already

know the type of case best suited for the operation. It remains for the general practitioner, in whose care so many consumptives necessarily remain, to study this aspect of the therapeutic problem, and to take the necessary steps towards consultation with the qualified internist and, it must be added, with the qualified surgeon.

F. B. GURD

**Abscess of Lung.** Lambert, A. V. S., and Miller, J. A. *Arch. of Surg.*, January, 1924, 8, Part II, p. 446.

These authors report the results of their experience based upon sixty cases, seen for the most part during the past two years. As they point out, the fact that they have seen many cases during so brief a period appears to indicate that abscess of the lung is a more common condition than is generally believed. The etiology of their cases is similar to that usually encountered, although the proportion of cases following operations on the mouth and upper air passages is somewhat smaller than usual. There were forty-five cases in men, and but fifteen in women. Of their total number of cases forty-six were classified as acute.

In ten cases the bacteriology was thoroughly investigated. The striking feature of these bacterial examinations of the abscess pus was the uniform presence of anaerobic bacteria. These predominated in all, and were the only type of organism present in eight of the ten cases. They urge that the matter of bacteriology be more thoroughly investigated.

The authors insist upon a closer co-operation between physician and surgeon, if this troublesome type of case is to be more adequately treated. They believe that the treatment of acute abscess is primarily a medical problem, and that when surgery is necessary the results are far more successful after preliminary medical observation and treatment. The most important form of medical treatment is postural drainage. They state that from three to four weeks of such medical treatment may usually be safely employed to determine the necessity for operation, during which time many cases will recover without it. They are not enthusiastic over the use of artificial pneumothorax, although they state that their experience is limited, and, as usually emphasized, they be-

lieve that it may help in acute abscess freely opening into a bronchus situated near the hilum of the lung. They have not been impressed by the results of bronchoscopic lavage, and appear to consider that the procedure is a more trying ordeal than has been the experience of other clinicians.

This paper was read at the May meeting of the American Association for Thoracic Surgeons. In the discussion which followed the general consensus of opinion was that postural treatment in the early stages was often of very great value. Singer of St. Louis, makes the statement that ninety per cent. of these cases clear up in a week or ten days. With regard to surgical interference he recommends that surgeons should wait for the abscess to become ripe and the surrounding pneumonitis to subside.

A. V. S. Lambert, of New York, makes the following important pronouncement: "The more I hear and see of thoracic surgery of others, the more I am becoming convinced that the analogies which are drawn over and over again between the chest and abdomen are not true analogies, and that we have a subject here the laws and principles of which have to be worked out in the chest and not determined from experience with conditions within the abdomen."

F. B. GURD

**The Selection of Patients and of Operation in the Surgical Treatment of Pulmonary Tuberculosis.** Lilienthal, H. *Amer. Jour. of Surg.*, January, 1924, xxxviii, p. 1.

The author prefaces his address by the remark that fortunately the surgical treatment of tuberculosis of the lungs is gaining headway in the United States. He is convinced that surgery in the treatment of pulmonary tuberculosis will advance in geometrical progression as more and more favourable reports come in.

He refers briefly to artificial pneumothorax, tuberculous and mixed empyema, and tuberculosis of the chest wall complicating tuberculosis of the lungs.

Lilienthal's conclusions are as follows:

1.—Surgery is not intended to supplant medicine in the treatment of tuberculosis of the lungs. It should be resorted to when medical and hygienic treatment have nothing more to

offer, and the patient's life is intolerable or the prognosis is grave.

2.—Operation may have two distinct objects. First, the placing at rest of the entire lung, and, second, the obliteration of apical cavities.

3.—Collapsing thoracoplasty, with phrenic nerve resection, puts the lung at rest to a greater degree than is possible by any other known method. It is only to be applied when the other lung can function sufficiently to support life, and when it is not affected by rapidly developing tuberculosis.

4.—Thoracoplasty does not take the place of therapeutic pneumothorax, for no return of function is possible. In pneumothorax lung function can be restored, when desirable, in a large number of cases.

5.—Arrest or great improvement following collapsing thoracoplasty may be expected in about seventy-five per cent. of the cases.

6.—The obliteration of apical cavities can be done on both sides of the chest. It is worth performing the operation when the disease in the remaining parts of one or both lungs is capable of arrest.

7.—The operations here discussed are sufficiently safe to be recommended in properly selected cases.

8.—The surgeon must never lose sight of the fact that although his wound may heal and his immediate objective be reached, his patient still has tuberculosis and will long require medical and hygienic treatment.

F. B. GURD

**The Clinical Diagnosis of Carcinoma of the Breast.** Battle, William H. *The Lancet*, Jan. 5, 1924, Vol. 1, No. 1.

The frequency of error in diseases of the breast is noted, and the importance of early recognition of carcinoma is emphasized. Warning is given against waiting for "text-book signs" and a plea is made for earlier sound advice.

The technique of examination is given: "Most mistakes are the result of an imperfect examination." In the history of the case the points emphasized are:—duration; how it was discovered; presence or absence of pain; possibility of injury and previous disease of the breast. A full view of the chest is insisted on; a warm room; covering for the patient's shoul-

ders and the warming of the surgeon's hands are points regarded as obligatory. The patient is first examined standing naturally, then with the hands lifted above the head, and finally in the recumbent position.

Cases are classified into three stages.

The first stage consists of those cases where there is a mass in the breast of an apparently healthy woman. There is no pain, often no tenderness or perhaps a dull ache at night time after being examined. These cases should be explored without delay.

In the second stage there is glandular involvement, changes in the skin and subcutaneous tissue, retraction of the nipple, sometimes cystic or colloid changes and rarely secondary infection and abscess formation.

The third stage is that of ulceration. According to Handley this occurs on an average of about two and one-half years after the disease is first noticed. Various types of ulceration occur. Marked oedema of the arm, fixation of the breast and infiltration of the skin may also occur at this stage. The danger of giving a prognosis as to duration of life is pointed out. A case of 40 years' duration is mentioned.

The following are the conclusions as to Paget's disease:—1.—That it is carcinoma. 2.—That it is primary in the breast. Complete removal is advised. The differential diagnosis between carcinoma and other conditions is discussed, notably cysts, fibro-adenomata and chronic inflammatory processes. Quervain's statement as to the importance of "*the movability of the tumour in relation to the rest of the breast tissue*" and the duration of the growth are emphasized as two of the most important points.

L. H. McKIM

**Treatment of Obstetric Brachial Paralysis with a Report of Fifty Cases.** Boorstein, Samuel W. *Jour. of Bone and Joint Surg.*, Oct., 1923, page 778.

Obstetrical brachial paralysis should be treated by the orthopedic surgeon as early as possible. If treated early and properly, one may expect in the mild cases a good recovery in three or four months. The more severe cases will require about six or seven months for a complete recovery. Nerve operations are

indicated if no improvement results in four months. If sufficient improvement is noticed in four months one may wait for four months more. The shoulder should be put immediately in a splint or brace to prevent stretching of the paralyzed muscles and contraction of the unopposed muscle. The arm is therefore put up in right angle abduction and full external rotation of the shoulder, the elbow is flexed at a right angle, forearm in full supination, and if necessary, dorsi-flexion of the wrist. The first plaster is left undisturbed for two or three weeks. Then the arm is taken down twice daily for massage and exercise. The support must be kept up for a very long time, for about eight to nine months, as deformities may occur. Adhesions may occur due to slight injuries of the capsule, but these can be prevented. The only deformity that is hard to prevent is the pronation of the forearm. The posterior dislocation is a sequel to the unbalanced paralysis of the shoulder muscles and may be prevented in most cases by proper orthopaedic methods. The obstetrician can prevent the condition in many cases by proper management of the shoulder. Taylor's procedure seems to be the most suitable for the nerve operations. Sever's operation is the best for correction of the shoulder deformities. Hooking of the coracoid process should be corrected by a subperiosteal resection. Pronation should be corrected by a tenotomy of the pronator radii teres. One may also transplant that muscle to use it as a supinator.

GEO. A. FLEET

**Discussion on the Treatment of Obstruction of the Colon.** Burgess, Arthur H. *Brit. Med. Jour.*, Sept. 29th, 1923, p. 547.

The author's remarks were based on the analysis of 1278 cases of acute intestinal obstruction, including small and large intestine, occurring during ten years, 1913-22 and admitted to the Manchester Royal Infirmary. More than half of these cases were due to strangulated external hernia. If the cases of intussusception, usually of the ileo-caecal type, were included, the colon was responsible for 28.48%. Malignant growth constituted 87.9% of all cases of acute colonic obstruction. The two most frequent sites for malignant growths were found to be in the rectum and sigmoid

colon. The latter is much more likely to give rise to acute obstruction. The splenic flexure was next in frequency.

When considering operative interference it is important to realize that 86.7% of the growths in the colon were located on the left side as against 13.29% on the right side. He found that the mortality of operations performed for acute colonic obstruction excluding intussusception was 33.66%. The highest mortality resulted from primary resection of the colon with immediate restoration of continuity (that is, without drainage of the proximal bowel). The author believes this method ought to be discarded. In the small bowel, however, this method is the operation of choice.

Whenever resection of the colon is essential, it must be combined with drainage of each end of the bowel preferably by tying in a Paul's tube. In cases of inoperable malignant growths of the colon where ileo-colostomy is the operation of choice, it must be combined with a caecostomy. Where the ileo-caecal valve is competent to prevent the regurgitation of caecal contents into the ileum, there is a serious risk of perforation of the caecum due to the tension caused by the gradual accumulation of intestinal secretions.

For purposes of treatment he divides the cases into three distinct groups. First, where it is impossible to tell before operation whether the obstruction is in the ileum or the colon: The size of this group should steadily diminish as more care is exercised in obtaining the history and by careful physical examination. The entire absence of any intestinal troubles prior to the onset of obstruction is in favour of the small intestine. Malignant growth, the most frequent cause of acute colonic obstruction, usually produces some previous intestinal disturbance such as colicky pains after meals, attacks of diarrhoea (especially when the right half of the colon is concerned) increasing constipation or the passage of large quantities of mucus. In the physical examination, one must determine where the bulging is most pronounced. The condition of the caecum is very important, if this is visibly distended or, if it can be definitely felt to alternately harden and soften, then the obstruction is distal to it. In this group exploratory laparotomy is essential

except in the most desperate cases. He uses a right paramedian incision through the fibres of the lower portion of the rectus muscle. If the condition of the patient is grave, as soon as the caecum is found distended, this incision is closed and a caecostomy is performed through a "gridiron" incision in the right iliac fossa. If the case proves to be an operable growth colostomy is at once performed. If, on the other hand, the growth is inoperable, short circuiting is preferable to an artificial anus, whenever the bowel distal to the growth is readily accessible. If this method is impracticable then a colostomy just above the growth is required.

In the second group we have those cases in which the obstruction is located to the colon, but its situation therein is not known. In this group "blind" caecostomy under local anaesthesia preferably, should be performed as the sole immediate procedure.

Group three includes those cases where the site of obstruction in the colon can be definitely ascertained. If rectal examination enables us to decide that the growth is inoperable then a left inguinal colostomy is performed. Otherwise he performs a caecostomy followed later by an exploratory laparotomy which then decides whether resection, short-circuiting exclusion, sigmoidostomy or transverse colostomy is the proper procedure.

GEO. A. FLEET

**Carcinoma of the Colon.** Romanis, W. H. C. *Brit. Med. Jour.*, Feb. 2nd, 1924, p. 183.

The writer divides the condition into three distinct forms:—The first is the annular or ring carcinoma, which is the commonest form and is met with more commonly on the left side of the colon than on the right. It produces obstructive symptoms earlier than do other forms and is intermediate in degree of malignancy. The second is the proliferating or fungating type which grows into the bowel lumen and forms a large tumour, commoner on the right side of the colon than on the left; it is the least malignant. The third is the hard, craggy ulcer which grows down in the bowel wall and infiltrates widely; rare in the colon, common in the rectum, it is the most malignant of the three types. Early diagnosis is difficult, but there are usually certain symptoms which may



give rise to sufficiently strong suspicion to justify an exploratory operation. These are, in the first place, colicky pains and uncomfortable sensation after meals, diffused more or less throughout the abdomen and often accompanied by loud borborygmi and gurgling. Sometimes patients will state that these borborygmi and pains seem to pass up towards some particular spot in the abdomen and then disappear, giving a feeling of blockage at a definite point long before any signs are present. Secondly, a history of a certain amount of irregularity in the action of the intestines, either diarrhoea or constipation. The right and left sides of the colon appear to behave differently in this respect, for whereas in the case of a growth on the left side of the colon there is nearly always more or less marked constipation, on the right side there is more frequently diarrhoea and loose motions. In addition to symptoms of disordered intestinal function, there are, as a rule, very definite changes to be found in the faeces. Blood is probably always present. Mucus is also usually present. The latter often affords some evidence as to the situation of the growth, for the nearer the growth is to the lower end of the colon, the greater the amount of mucus. Anaemia is often a very marked feature. More or less distension appears as soon as any slight tendency to obstruction sets in, often long before there are any signs of acute or absolute obstruction; and wherever in the colon the growth is, this distension will affect the caecum chiefly and this distended caecum will be both visible and palpable. Accessory methods of diagnosis are often of use, such as x-ray examination with bismuth or barium in the form of a meal or high enema (the writer prefers the high enema); rectal examination; bimanual examination under an anaesthetic or the use of the sigmoidoscope.

When the final obstruction supervenes and no motion or flatus may be passed at all, there is often an absence of the classical symptoms of acute intestinal obstruction—and the condition may not appear to be at all acute in nature. Pain and vomiting are often absent—at any rate, for several days; and not infrequently the patient remains for a week or ten days without passing anything, without pain

or vomiting, with a good pulse and clean tongue. The only symptom which points to the seriousness of the condition is the gradual and steadily progressive distension of the abdomen which persists, and, after a few days, may lead to a most enormous abdominal over-distension. This affects first the right flank and right iliac fossa, but soon involves the whole of the abdomen which becomes uniformly blown up and tympanitic. Shifting dullness may be present in the flanks.

As to treatment, the cases are regarded from two standpoints: 1. Obstruction—acute or sub-acute; 2. In early cases, where there is no obvious obstruction.

In the selection of operation, having ascertained whether the growth is removable or not, the obstruction must be relieved and there are three main ways of doing this: 1.—By a colostomy or caecostomy above the growth. 2.—By short-circuiting the growth by anastomosing the bowel above the growth to that below the growth. 3.—By excising the growth, leaving the two ends of the bowel open and tying Paul's tubes into them. On no account must the growth be removed and the radical operation completed in one stage by anastomosing the bowel ends, as the bowel wall, in its distended, sodden and septic condition will not hold the stitches well.

If the growth is not operable and the question of removing it later does not arise, a colostomy, if done, will have to be permanent, and the question arises whether or not a short-circuit is the more pleasant for the patient. In this case, the writer prefers a short-circuit providing the bowel is not too distended and sodden so that the short-circuit will carry too great a risk. When the growth is in the caecum and near the ileocaecal valve, there will not be room to do a caecostomy above, and an ileostomy is not a justifiable procedure owing to the starvation and the digestion of the surrounding skin which is produced. A short circuit between the end of the ileum and colon, below the growth is the only procedure to be carried out. The third method, as mentioned, is not practised by the writer, for it is an unnecessarily elaborate operation to undertake while an acute condition is present. The mortality of these operations is in the neighbour-

hood of 25%. The causes are attributed to sudden collapse—to failure of the colostomy to act owing to the way in which it is done, the hyper-distended bowel being brought through the abdominal wall and a Paul's tube inserted into the side of it. The constriction of the protruding gut by the abdominal muscles may be sufficient to prevent the semi-paralyzed bowel from expelling its contents. This is prevented by introducing a tightly fitting rubber tube into the Paul's tube, so that it will run into the bowel for three or four inches and stand out of the tube for about the same distance.

In the non-obstructed cases, the treatment depends upon whether or not the growth is operable. If it be found small and movable and there are no secondary growths, it is capable of removal. If there be a big mass of glands at the root of the mesentery or on the aorta or in the hepatic fissure or secondary growths in the liver, omentum or peritoneum, no attempt should be made at removal. In the latter case, a short-circuit above and below the growth will relieve symptoms and prolong life.

In cases where the growth is removable, the treatment depends upon the situation and extent of the growth. Thus, for growths in the caecum or right hand side of the colon, it is necessary to remove the whole of both the caecum and the ascending colon, in order to be certain of keeping outside the limits of the growth. In doing this, one is liable to interfere with the blood supply of the lowest few inches of the ileum and to leave a blind pocket of transverse colon near the hepatic flexure. It has therefore become the custom, in this situation, to remove the lowest five inches of ileum, caecum and ascending colon, and a few inches of the transverse colon, and unite the ileum to the transverse colon.

In cases of growth of the transverse and pelvic colon, simple resection of the growth with a deep V of the mesentery is sufficient. In the descending colon or splenic flexure, mobilization of the flexure and colon is necessary—and then the removal of a few inches of the transverse colon and flexure and all of the descending colon.

When dealing with portions of the large bowel which are not covered with peritoneum end to side unions are preferable if possible.

W. W. RUDDICK

## ANAESTHESIA AND ANAESTHETICS

**The Action of Chloroform on the Heart.** Levy, A. G. *Proceedings of the Royal Society of Medicine*, Oct. 28, 1922, p. 30.

Patients with valvular disease are frequently good subjects for chloroform anaesthesia. Ventricular fibrillation, the condition underlying chloroform syncope, is essentially a manifestation of a heart which is healthy, except in so far as it is under the influence of chloroform. A heart with depressed muscular action is less subject to syncope. There is no evidence that endocardial lesions or muscular degenerations predispose to chloroform syncope.

In cases of status lymphaticus, where death occurred under chloroform, the administration was light and brief or there was some irregularity of administration. It is this light anaesthesia which is conducive to ventricular fibrillation.

Deep chloroform anaesthesia frequently leads to heart block in animals. It is conceivable that pre-existing heart block may be accentuated by chloroform, the use of which in such cases should therefore be avoided. W. B. HOWELL

**Ethylene Anaesthesia** (Anesthésie par L'Ethylene). Papin, E. et Ambard, L. *La Presse Médicale*, Feb. 13, 1924, p. 133.

Ethylene has a characteristic smell, somewhat resembling essence of rose. It is inflammable when mixed with oxygen. It can be administered with the same apparatus as nitrous oxide. The quantity of oxygen given with it depends on the colour of the skin, enough being given to avoid cyanosis.

It must be remembered that the re-breathing which takes place when nitrous oxide apparatus is used, causes the accumulation of a good deal of CO<sub>2</sub> and that ethylene anaesthesia is really anaesthesia with ethylene, oxygen and CO<sub>2</sub>. If enough oxygen is given to keep the colour good, and CO<sub>2</sub> is allowed to accumulate, there is a tendency for the patient to wake up. This can be obviated by cutting down the amount of oxygen and producing cyanosis or by keeping up a free supply of ethylene so as to wash out the CO<sub>2</sub>. Full anaesthesia is induced with ethylene in from five to ten minutes. The lid

reflex disappears only after about 15 to 20 minutes.

Complete recovery of consciousness takes about five minutes. Sensation is somewhat dulled for a considerable time after waking up.

W. B. HOWELL

**Synergistic Anaesthesia and Analgesia in Surgery.** Gwathmey, J. T. *Medical Record and Journal*, New York, Jan. 16, 1924, p. 69.

The expression "synergistic anaesthesia" means the reciprocal augmentation of the action of one or more drugs upon one another, with unconsciousness.

The writer gives 200 cc. of a 4% solution of magnesium sulphate with four drachms of par-

aldehyde, by rectum, about an hour before operation. At the same time he gives one eighth of a grain of morphine hypodermically, every 20 minutes for three doses. In slight operations no inhalation anaesthesia is necessary, but if the abdomen is opened a few inhalations of nitrous oxide and oxygen are required. Occasionally when there is much traction on the viscera, a little ether may be added.

The most conspicuous result of this method is the total absence of shock and exhaustion. The patient is often surprised to hear afterwards that the operation is over.

Nausea, vomiting and gas pains are more nearly eliminated by this method than any other.

W. B. HOWELL

**The Resistance of Malaria to Quinine.**—In 1917, reports began to appear that English soldiers in the tropics were being attacked by malaria that quinine would not cure. Pratt-Johnson and Gilchrist found that relapses were reported in 23 per cent. of 18,000 soldiers in Africa while quinine was being administered; Phear reported in Macedonia that quinine was ineffective; Mackie found quinine ineffective in malaria in northern Persia, and the accumulation of invalids in Saloniki was constantly increasing. Many soldiers were sent back to England from Macedonia in 1918, and Sir Ronald Ross arranged to treat the malaria patients in special wards at Southampton. In recently published notes, Fletcher says that 1,150 patients were admitted to these wards in twelve months, and that on landing parasites were found in the peripheral blood in 487. Although many had documentary evidence of treatment with quinine in various hospitals, they were placed on 10 grains of quinine by mouth twice a day. There was strict supervision of these patients, and special interest in relapses that might occur. In every instance the routine treatment prescribed at Southampton caused both fever and parasites to disappear. Fletcher emphasizes the Southampton experience by a report of his observations in the Federated Malay States since the war. The patients seen there were little more than skeletons and dysentery was a complication in 53 per cent. Forty-four difficult cases in which

quinine had been disappointing were selected, and 10 grains (0.65 gm.) of quinine by mouth twice a day was given for four weeks. The drug was placed in the patient's mouth by the physician, and, after it had been swallowed, the mouth was inspected. Not one of these coolies in Kuala Lumpur failed to improve. There was in one a small number of parasites that persisted in the blood in spite of quinine, but in every other case, both fever and parasites disappeared. Dysentery did not make any difference. The conclusions of this study was the same as among soldiers in Southampton; that the so-called resistance to quinine vanished when the quinine was actually swallowed and retained. The obvious alternative would seem to be to resort to injections. Intramuscular injections of quinine were used extensively in the campaign in Macedonia, and this practice was subjected to inquiry. It was demonstrated experimentally that whatever concentration or whatever salt was injected, there was necrosis of the muscle at the site of injection. Large nerves may be involved with paralysis, and abscesses may form. Sir Patrick Manson opposed intramuscular injections unless made for good reasons. Sir Ronald Ross has repeatedly expressed his opposition in ordinary cases. It is not generally recognized that intramuscular injections of quinine always cause necrosis, and that quinine is absorbed more quickly by mouth.—*Jour. Am. Med. Ass.*, April 5, 1924.

## Obituary

**Dr. Henry Beauchamp Gourlay.** Following a brief illness of four days, Dr. H. B. Gourlay passed away, as the result of pneumonia, at his residence in Vancouver. His untimely end came as a great shock to his many friends and colleagues. Dr. Gourlay was born November 3rd, 1875, in Huntley, Ontario. His early education was obtained at public school and Ottawa Collegiate. He was a graduate of Ontario College of Pharmacy 1899-1900. Entered McGill University Medical Faculty in September, 1902, graduating June, 1906. On leaving he came direct to Vancouver and served as an interne for a short time in the Vancouver General Hospital, and then went to St. Paul's Hospital, Vancouver, where he spent one year. Dr. Gourlay rapidly became one of Vancouver's leading medical men. He was on the staff of the Vancouver General Hospital for the past six or seven years, and also on the staff of St. Paul's Hospital. He was rapidly getting away from general practice and was devoting his attention to surgery, in which branch he showed great skill and promise. In his death the medical fraternity has lost a most valuable surgeon, a true friend, and a wise counsellor.

His most notable characteristic perhaps, as a surgeon and physician, was a sane conservatism. He was quite capable of quick and definite action, but his bent was always towards caution; and he was an eminently safe consultant. In these days, when operating is so easily done, and so often apparently, done with impunity, he set an example to his younger colleagues which could not fail to be of the greatest value to them. He was greatly beloved by his patients and those with whom he came in contact, and the universal high esteem and confidence held for him by his medical confrères, is one of the most notable evidences of his real worth as a man and a physician. This was strikingly shown by the great number of medical men, as well as friends and acquaintances, who attended his funeral as a last mark of respect and affection.

He leaves a widow and five children. The greatest sympathy is felt for his family, to whom he was not only a loyal husband and devoted father, but also a most wonderful companion and chum. In him, Vancouver has lost one of her most valuable citizens.

**Dr. Avila R. Lemire Marsolais** died recently at Outremont after a short illness. He was 65 years of age and was born in Sainte Beatrice on February 14th, 1859. He received his education at the Montreal College and Laval University. In 1883 he became interne at the Notre Dame Hospital. In 1889 left for the United States and Europe to perfect himself in his profession. On returning to Montreal he was identified with Notre Dame Hospital. He was also professor at the Montreal Medical School, and for many years secretary of the Medical College of Quebec. For 24 years he was chief medical adviser for the Montreal Light, Heat & Power Consolidated. Dr. Marsolais served for three years as alderman for the city of Outremont.

**Dr. L. G. Poulin** of St. Casimir died from an attack of heart failure before assistance could reach him.

**Dr. J. O. Bolduc**, well known in medical circles in Canada and the United States, died at his residence in Chicago. He was 64 years old. A graduate in medicine from Laval University, Montreal, he practised there for several years, removing to Chicago about 30 years ago.

**Dr. John Emerson Hansler** died at Fonthill on April the 1st. Dr. Hansler was a graduate of the University of Toronto Medical Faculty, practising first at Linden and later at Fonthill.

**Infections of the Lip.**—Three fatal cases of lip infection are reported by Maurice Kahn, Los Angeles. One patient picked open a pimple with a needle and squeezed it. He died thirty-six hours later. No necropsy was done. The second case gave the same history. Secretions from the wound showed *Staphylococcus aureus*. The patient died on the sixth day. The third patient with a similar history died on the tenth day. Kahn says that *Staphylococcus aureus* is almost invariably the infective agent in these cases. The fatal cases usually show cavernous sinus thrombosis or metastatic abscesses of the lung or in various parts of the body, with thrombophlebitis of the facial vein and its tributaries. It is pointed out that the reason for the fatalities lay in the abundant vascular

drainage of the region of the lips, thus making more likely venous thrombosis. Having in mind also the absence of connective tissue spaces, it will be seen that in infection of the lip the infective agent is brought into immediate intimate contact with the venous plexus of the lip. The almost constant motion of the lips has a tendency to disseminate the infection early in the disease by what is a mild degree of squeezing or rubbing of the infection against the vein wall. Later on, when the swelling has become marked, the pain would of itself inhibit any great amount of motion. But before this stage has been reached, another factor has entered and one of supreme importance, i.e., the squeezing.—*Jour. Am. Med. Ass.*, Mar. 29, 1924.



## Medical News from the British Empire

## GREAT BRITAIN

SIR WILLIAM MACEWEN, C.B., M.D., LL.D., F.R.S.

A great surgeon has recently passed away at Glasgow, Scotland, Sir William Macewen, Regius Professor of Surgery in Glasgow University and Surgeon to the King in Scotland. He was born at Rotheray in 1848, graduated from New Glasgow University in 1869, was house surgeon to Sir George McLeod, and for some time Superintendent of the City Fever Hospital. In 1877 at the age of 29, Macewen was full surgeon at the Glasgow Royal Infirmary and was there until 1892 when he became Regius Professor of Surgery and removed to the Western Infirmary, which was the University Hospital. He was active up to the end and served for 47 years as surgeon. The chief part of his work was done at the Royal Infirmary, and at an early date his attention was directed to bone lesions and the growth of bone. He devised a new operation for knock-knee and for correcting this deformity his linear osteotomy is the only operation performed for this condition at the present time. He also originated a new operation for the radical cure of hernia. From the very first Macewen was a believer in antiseptic surgery, and thus early got good results. Forty years ago he used bone grafts extensively, and showed a case where he had restored a humerus which had been destroyed by disease. The writer first met Macewen in 1887, and there saw his wonderful work in bone surgery. He devoted much time to showing me his operation for the resection of joints, especially the resection of the hip joint for tuberculosis; his patients were up and about in six weeks. He also reserved for my especial benefit cases of knock-knee so that he could show me all the steps of his linear osteotomy, first performed very fast and then very slowly so that I could learn more easily. At that time he had operated on the brain some sixty times, but he had published little, waiting until he could publish a large series several years after operation so that the conclusions derived therefrom should be as correct as possible. He had the greatest contempt for those surgeons who rush into print having had only one case of any operation, and before the final result, good or bad, can be known. He had many peculiarities, *e.g.*, he used only his own instruments whose manufacture he had himself supervised and the quality of whose steel he had tested. He carried them about in a specially devised case. He would only have nurses in his wards approved of by himself, and instead of operating in a common theatre, made use of the end of a passage with a good light. He was not liked by his colleagues because he almost entirely ignored them and went his own way. He was at that time a tall, thin man of about forty, very upright, handsome with a very keen eye, very earnest and decided in his manner, an acute observer and a man of ready resource. He was certainly dogmatic and wanted you to verify any statement you made. He struck me as a man of great determination and a compelling presence. In 1887 the writer visited most of the clinics of Great Britain, Ireland, Germany and France, and met many distinguished surgeons, but Macewen struck him as being the ablest and most original of them all. His personality was impressive, and at large meetings where I saw him afterwards, he always dominated the assembly. Once he was passing through Montreal on his way west; he telephoned me from the Windsor Hotel about 10 p.m. to come and see him. I did so and we got into a discussion about some pathological condition and I said I had some specimens in museum at the college bearing on the point, and

although it was near midnight he wanted to go up at that late hour to see them; he was leaving early next morning. However, I did not think we could get in, so we decided not to go.

At the British Medical Association meeting at Glasgow in 1888, Macewen gave an extra address on cerebral surgery. To the astonishment of the audience he opened a new era in brain surgery and kept his hearers enthralled whilst relating the very remarkable work he had been doing at the Royal Infirmary for some years past. I had seen some of this work in 1887 as related in a lecture recently reported in this *Journal*.

Macewen now at once took his proper place as one of the leading surgeons of the world. His work on brain abscess and sinus thrombosis, the result of ear disease, was epoch making; for many years he had been dealing radically with chronic middle ear disease by the mastoid operation. His classic "Atlas of Head Sections" consist of beautiful photographs of sections made by himself and photographed, too, by himself. In consequence of his great surgical work he was elected F.R.S. His LL.D. was conferred on him by his own University. He was elected an Honorary Fellow of the Royal Colleges of London and Ireland, and received many foreign honours. In 1902 he was knighted and made surgeon to the King in Scotland. During the war he was consulting surgeon to the naval forces in Scotland, and he was chiefly instrumental in establishing the "Princess Louise Hospital" for making and supplying artificial limbs to soldiers and sailors.

Last autumn he went to Australia in behalf of the British Medical Association, and had not long returned when he contracted pneumonia and died in his 76th year. He was working in his wards a few days before he died. He received many honours from many universities and Societies and was made a C.B. for his services in the war. When the Johns Hopkins Medical School was in the making he was offered the chair of surgery but declined.

F. J. SHEPHERD

## THE COUNTRY MEDICAL PRACTITIONER

A somewhat gloomy picture has been drawn by Dr. J. P. Williams-Freeman of the plight of the country medical practitioner, especially in the more remote country districts of England. The conditions are such as may probably be noted in all countries where towns are on the increase, and the wealth produced by the country is on the decrease. To such factors must be added the important changes brought about by the advent of the motor car. Not only does the latter development account for the transfer of a certain amount of work to the larger centres, but it adds (and with disproportionate returns) to the area to be covered by the country doctor.

In Dr. Freeman's opinion, there is a steady deterioration in the position of the country practitioner, and the matter deserves the serious attention of the rest of the profession. It is the general social necessities of the case which are most important. A doctor should not be expected to economise because he lives in the country; beyond a certain reasonable point such economy is bound to adversely affect his standard of living, and this will particularly show itself in the bringing up of his family. His children will not be sufficiently educated. Inevitably, then, the good man will not go into country practice; it is already noticeable how many village practices have been abandoned altogether, and how often many others

change hands as one man after the other comes to realize the working conditions.

And yet "the good type of village practitioner is worth keeping and is of some value to the State." And again, "the State cannot afford to let the early diphtherias, appendicitis and strangulated hernias wait a day or two, to say nothing of accidents and midwifery emergencies." The National Insurance Act has brought great benefits to the working classes; first-class medical attention is now within the reach of everybody; but the working of the Act has accentuated rather than ameliorated the financial disadvantages of country practice. Apparently the readjustment of the insurance capitation fee has not solved the problem sufficiently. The transportation expenses alone are higher proportionately in certain country districts than in urban areas.

He would not suggest a different capitation fee for the country doctor. But there might be arrangements made for extra grants as is done for necessitous practitioners in Scotland: also increases in the salaries of Poor Law medical officers might be made. Such suggestions were only made with the idea of helping the capable hard-working country practitioner. Such a man is doing good work for the community, but his lot is so cast that he cannot earn the living he deserves in consideration for the work he does.

However detached these reflections may seem to the Canadian medical man, they cannot be passed lightly by. The problem may not yet be presenting itself so acutely to us, but it will develop as the country develops.

In connection with the British Empire Exhibition a committee of medical men has been formed with the object of welcoming their colleagues from the dominions and colonies visiting the metropolis. One of the first duties of this committee will be to form an executive body and undertake the organization of hospitality to be extended to medical practitioners from overseas. For this purpose it is desired to ascertain beforehand as far as possible the names of the intending visitors and the periods of their visits. The Royal Society of Medicine, as has already been announced, will welcome all duly accredited members of the medical profession during their stay in the home country, and it is requested that intending visitors will communicate without delay with the Honorary Secretaries of the Hospitality Committee, at 1, Wimpole Street, London, W. 1.

In reply to a question in the House of Commons on February 19th, the Minister of Health stated that the incidence of venereal diseases was declining, as far as his information went; also, that the provision of free treatment had undoubtedly contributed towards this result. When asked if similar methods of free treatment of other diseases might be adopted, he replied that there were certain features of venereal diseases which differentiated them from other communicable diseases, but he could not undertake then to discuss the expediency of adopting these measures to the extent mentioned.

The recent outbreak of foot-and-mouth disease in Great Britain has been extremely severe. The first case occurred in Yorkshire last August, and since then there have been 2,617 outbreaks. These have involved the slaughter of 89,000 cattle, 30,000 sheep and 110 goats. Isolation had been adopted as an alternative measure in only a few cases. On the advice of Sir William Leishman, a small committee of veterinarians and human pathologists will be appointed to frame a scheme of investigation into the cause of this disease and to discover some method of rendering the stock immune.

A special discussion was held at the Royal Society of Medicine in January last on the grading of the population from the point of view of physical fitness. A question of such far-reaching dimensions must be of

interest to many differently occupied workers. But it would involve the gathering of reports on large sections of the population, and even then it might be asked how such data would be put to practical use. To this it could be replied that they were invaluable to the Minister of Health, to teachers of physical culture, to industrial psychologists and to students of eugenics. It was in such terms that the discussion was opened by Air Commodore D. Munro, Royal Air Force. He pointed out that the degree of physical fitness was not to be easily measured, especially since complete clinical examinations would be out of the question. He thought, therefore, that certain tests in use in the Royal Air Force for the assessment of the physical fitness of pilots would supply the necessary information. These tests were designed to measure the physical and mental endurance, and he mentioned two. In the first, the subject was asked to empty the lungs completely, inhale fully and blow mercury into a tube to 40 millimeters, maintaining it there without breathing as long as possible. The pulse was counted meanwhile, in periods of five seconds. A marked rise in pulse rate was unsatisfactory, and still more unsatisfactory was a marked rise during the second or third period, followed by a dying away to normal or below normal.

Such a test gave evidence as to the stability of the nervous system generally, and more especially regarding the centres controlling respiration and circulation. It was an index also of the power of endurance under fatigue and adversity, and was of great value in helping to estimate these never too easily definable qualities. The factors involved in this test were oxygenation of the blood, respiratory efficiency and tone of the blood vessels.

The second test mentioned was response of pulse to exercise, and in this either change of posture or certain prescribed exercises were carried out in a given time, and the effect on the pulse either at the moment or immediately afterwards noted. This gave some idea of the splanchnic vaso-motor control, and enabled one to differentiate to some extent between true and false tachycardias.

Commodore Munro dwelt on the advantages of these tests, their ease of application and the possibility of results being codified and expressed in numbers. It was found that even slight temporary upsets were sufficient to markedly influence the results of the tests, and account would always have to be taken of anything relevant in past histories. He admitted too that the actual carrying out of such tests in civil life would be much more difficult to arrange than in the Services. He could suggest no agency, but thought that the co-operation of the Medical Research Council would be essential. Other speakers also anticipated much difficulty in carrying out the tests, but it was made clear that they were not intended to replace clinical examinations; they showed mainly the efficiency of the controlling centres of respiration and circulation. It seemed clear that if a man persistently circulated blood which was not well oxygenated his whole nervous system was likely to change. Sir Arthur Keith had been quoted as favouring stature as a standard of fitness, but he explained that that statement was to be modified. He had used stature in the *Report of the Ministry of National Service* as representing an infinite number of factors, including length of limbs and musculature, but these might prove misleading. The tests under discussion he thought a great advance on anything previously suggested.

On the whole it was agreed that the tests were only to be considered as part of a multiple examination, and it was the general assessment which was the important thing.

H. E. M.

*Emeritus Professor Alexis Thomson of Edinburgh died at Algeciras on March 4th, and thus passes one of the great surgeons of the present day, distinguished for his operative work, for his teaching, and for his*

writings. He was born at Edinburgh in 1863, had a brilliant career as a student, and after graduation acted as an assistant in pathology to Professor Greenfield. To the end of his days Alexis Thomson was fond of carrying out research work, and in his lectures, which always held the students' attention by their clearness and by his picturesque way of presenting the subject, surgical pathology occupied an important place.

As has been the case with so many men at Edinburgh he first made his name as a teacher in an extramural coaching class which as young men, he and Harold Stiles conducted. In 1892, Alexis Thomson was appointed assistant surgeon to the Royal Infirmary

and in 1909, when his master, Professor Chiene, retired, was made professor of systematic surgery. This position he held until he resigned, owing to ill-health, in the spring of 1923. During the war he was consulting surgeon to the third army of the British Expeditionary Force. His *Manual of Surgery*, written in collaboration with Mr. Alexander Miles was first published in 1904 in two volumes, and in later editions in four volumes. Sir Herbert Stiles writes that "as a text-book for students and practitioners there is no better in any language." The influence of this great teacher has been almost world wide, for Edinburgh draws students from all parts of the globe, and his loss will be felt keenly.

### AUSTRALIA

It is stated in a recent article on diphtheria that in 1922 there were reported from the whole Commonwealth of Australia 14,182 cases, with 522 deaths. The number of reported infections was 38.8% less than in 1921. Three methods are recommended for the elimination of this disease: the recognition of all individuals harbouring virulent Klebs-Loeffler bacilli; the isolation of these persons; and the immunization by the Schick method of all members of the community who are susceptible to the bacillus in question.

Some interesting observations are made by G. A. M. Heydon on the incidence of malaria in Rabaul, New Guinea. The district is 4.5 degrees south of the Equator, with an annual average rainfall of 83 inches. The sources of the mosquito (*anopheles punctulatus*) were, inadequate drainage along the shore line, with surface wells and one or two small streams. The

author states that the view popularly held that malaria in the territory is of importance chiefly to the whites, is a mistake. The chief sufferers are native infants. A native baby is a new arrival in the country and is unprotected by acquired resistance to malaria. The disease, in his opinion, is an important cause of the high infantile mortality in the natives.

During the work of the Australian hookworm campaign at Townsville, North Queensland, in the summer of 1920-21, the opportunity was taken of examining a number of faecal specimens for protozoal systs. The number of specimens examined was 440: cysts were found in 208 of these. The protozoa found were, lamblia intestinalis 84, entamoeba coli 70, entamoeba histolytica 5, iodine cysts (of Wenyon) 7, blastocystis hominis 109.

L. H. M.

### SOUTH AFRICA

A leading article in the January number of the *South African Medical Record* passes in review some of the economic conditions in South Africa which affect the medical profession in that country. In 1923 there was great financial depression, which is being only partly balanced by an improvement in the price of wool, and the recovery of the gold industry: a more directly adverse influence has been the steadily increasing number of practitioners. The effect of the financial depression is dwelt on in some detail, but one can see little difference from our own experience of how lack of prosperity causes diminished collections. Comparison is made between the present lean years in South Africa, and those immediately following on the Boer War, but bad as these latter were, there were compensating factors such as the generally lower cost of living, and the fewer number of medical men: and neither of these now prevail.

Without being intentionally pessimistic, the feeling apparently is that the financial position of the medical profession in South Africa generally has become more difficult, and is not improving.

The following figures are extracted from the last census figures for South Africa. The total European population is 1,519,488, of which 782,035 are males

and 737,453 females. Under 15 years there are 564,904 children, almost a third of the whole population. The male population between 20 and 39 has decreased by 29,753, as compared with 1911. This is due partly to losses in the war, and also to emigration.

Bubonic plague is apparently endemic to some extent in certain parts of South Africa. The Department of Public Health is fully aware of the fact, but in discussing the matter some of the difficulties in the control of this disease are made apparent. Complete eradication is only possible with entire destruction of the rodents which carry the disease by means of their fleas, and this complete destruction is an extremely difficult task. Sporadic outbreaks therefore, are to be anticipated, but there is no excuse for public alarm as they can be confined to comparatively restricted areas. The trouble lies in the carrying of plague infected fleas from one area to another. Vigorous measures are taken to combat this by rat-killing campaigns, but there is a channel also in the transport of grain and other produce from the contaminated areas. Free inoculations of everyone on infected farms, public meetings at which the gravity of the disease is explained, and the issuing of pamphlets on the matter are amongst the steps taken to control the situation.

H. E. M.



## News Items

### GENERAL

The 2nd annual meeting of the Canadian Society for the study of Diseases of Children will be held in Toronto, June 13th and 14th, 1924. Scientific meetings will be held at the Hospital for Sick Children on the mornings of the 13th and 14th and the afternoon of the 13th.

*Officers.*—President, Dr. Alan Brown; Vice-president, Dr. Allan Caulfeild; Secretary-Treasurer, Dr. Edward A. Morgan, Toronto. *Executive Council.*—Dr. Geo. Campbell, Ottawa; Dr. H. P. Wright, Montreal; Dr. C. Clark, Hamilton.

Inter-State Post-Graduate Clinic Tour to Canada, British Isles, and Paris in 1925, is now being arranged under the supervision of the Managing-Director's Office of the Tri-State District Medical Association. The time for leaving will be about the middle of May.

The tour will consume, approximately, two months' time and the total cost from Chicago and back to Chicago again will be less than \$1,000.00. This will include all clinic arrangements and admissions and all travelling expenses, except meals on Pullmans in Amer-

ica and tips on the ocean steamer. First-class hotels will be used everywhere, and the ocean passage will be on the largest and finest of the new one cabin ships.

Clinics are being arranged in Dublin, Belfast, Liverpool, Manchester, Leeds, Edinburgh, Glasgow, Newcastle, London and Paris and other points of clinical interest. The clinics will be conducted by the leading clinicians of these cities. The opportunity will be given, subsequently, to visit the clinic centres in other parts of Europe.

This tour is open to members of the profession who are in good standing in their state or provincial societies, and their families and friends.

Sight-seeing programmes will be arranged practically every day abroad, including the most scenic part of the countries visited, without extra cost.

On account of the great demand for reservations, applications should be made as early as possible to Dr. William B. Peck, Managing-Director, Freeport, Illinois. Preference in the assignment of hotel and steamship accommodations will follow in the order in which the applications are received.

### NOVA SCOTIA

The spring examinations of the Provincial Medical Board begin on the first of May. The annual meeting of the Board is to be held on the ninth of May.

Among the Nova Scotia physicians who have already left or are about to leave for studies overseas are Dr. L. R. Morse, of Lawrencetown, and Drs. S. H. Keshen and C. W. Holland, of Halifax.

The serious illness of Dr. Bruce Almon and Dr. W. D. Finn, of Halifax, is greatly regretted by their professional colleagues and hosts of other friends, who unite in wishing them a speedy recovery.

The March meeting of the Osler Medical History Club was held at the residence of Dr. G. H. Murphy, on the 29th of the month. Dr. Murphy read an intensely interesting, scholarly and most attractively composed paper on the contributions of the Celt to learning, with special reference to medicine.

At the meeting of the Halifax Branch of the Medical Society of Nova Scotia held on the 26th of March, Dr. Hattle gave an address on the early history of medicine, dealing particularly with the influence of the schools of Greece, Alexandria and Salerno, and referring to notable contributions of physicians to branches of learning other than medicine.

The dates for the Annual Meeting of the Medical Society of Nova Scotia have been fixed for July 16th and 17th. The meeting is to be held at Amherst, under the presidency of Dr. O. B. Keddy. The Bulletin of the Society is to be published every month hereafter, instead of every two months. At a recent meeting of the executive, it was decided to protest against the proposed withdrawal of the federal grant in aid of work aimed at the control of the venereal diseases,

and the action of the president and secretary in protesting against the replacement of medical superintendents and administrators of D.S.C.R. hospitals was endorsed.

The new Dalhousie Health Centre is approaching completion, and will be ready for occupation within a few weeks. This building is to serve as an out-patient department for the several hospitals which are immediately adjacent to it, and will also accommodate a number of voluntary agencies engaged in social and public health work. It is proposed to utilize the advantages of this grouping of agencies for the instruction of students in the social phases of medicine.

During the month of March, 102 clinics were held at the Health Centres of the Massachusetts-Halifax Health Commission. The special eye-clinic, which was opened in February, had an attendance of 141 adults and children. Ninety-seven children attended the pre-school age dental clinic for prophylaxis and treatment. Five hundred and ninety-seven children attended the various nutrition classes held at both centres on Friday and Saturday each week. The tuberculosis examiner made 52 chest examinations, 15 of which were in consultation with ten city doctors. His assistant made 18 examinations—70 in all. The Commission's pathologist examined 90 specimens during the month, which included 44 Schick tests, 22 urinalyses and 11 blood pictures. His services were required by five city doctors. During the month the public health nurses paid 4,375 visits in the homes for health teaching purposes. Local sub-stations were opened on Lower Water Street, and Greenbank on March 12th and 19th respectively, the former to be open every 2nd and 4th Wednesday, and the latter every 3rd Wednesday. These will be primarily baby welfare and child welfare stations for such as belong to these two districts, which are quite a distance from the Centre at Admiralty House.



## NEW BRUNSWICK

The annual meeting of the New Brunswick Medical Society will be held this year in St. John on July 22nd and 23rd. A definite announcement of the date has been delayed owing to efforts made by the Committee to secure for the programme several members of the profession who had arranged to speak at the Nova Scotia meeting. Train schedules unfortunately interfered with any arrangements that could be made. This failure to obtain their presence is a matter of regret to the Committee, not only on account of the personality of the speakers, but also because of the loss to the programme. It is, however, hoped to have a large attendance as business of the utmost importance is to be transacted. The Committee are fortunate in securing Dr. W. E. Rowley for the programme. Dr. Rowley will give an account of the progress made in the treatment of diabetes. He has had charge of cases in which insulin has been administered, and his contribution should therefore be interesting and instructive.

Dr. S. H. McDonald, late President of the New Brunswick Medical Society, has been elected president of the Council of Physician and Surgeons for New Brunswick. During his occupation of the presidential chair it is hoped that the Council will take vigorous action regarding the illegal practice of medicine and all other infractions of the Medical Act. The doctors of the province have been complaining of a lack of initiative on the part of the Council in the past.

The impromptu vote of thanks that was tendered Dr. Hipwell at the conclusion of his insulin clinics, held in St. John for the benefit of New Brunswick practitioners, but feebly expresses the thanks and appreciation of the men who attended the sessions. That he has given all of us a more intimate conception of insulin is freely admitted, and to the out-of-town men the possibility and practicability of its use in New Brunswick was a revelation. Dr. Hipwell's patience in explaining the intricacies of the drug, his knowledge of its clinical vagaries, and above all his desire and ability to give all a working

familiarity with its administration and dangers were greatly appreciated. All members of the profession in the province are very grateful to Dr. Hipwell and will welcome him on any future visit to New Brunswick.

The most modern and complete x-ray plant in the Maritime provinces has been installed in the General Public Hospital, St. John. Practically one-half of the first floor of the hospital has been devoted to this department. Dr. Kirkland, who is a thoroughly competent radiographer is in charge. A Victor deep x-ray machine has been added to the equipment. It is hoped that the public will take advantage of this opportunity for treatment under the supervision of our competent director. There is also a machine for dental x-ray work. We trust that this department as a whole, instead of being a heavy charge on the finances of the institution will in the future become a revenue producer. With the radiographic department in working order the last of the many and great improvements in the General Public Hospital has become a reality and the institution can claim to be modern and up-to-date in every way. The new epidemic ward, the nurses home, and the new outdoor and x-ray departments have necessitated the expenditure of a large sum of money, but the good results obtained, together with the added incentive to good work on the part of the physicians and the renewed confidence the people have in their hospital more than repay the monies expended.

Intra-provincial registration was a subject for discussion at a recent meeting of the council and is a subject deserving of the earnest consideration of the various governing bodies in the Dominion. At present an incompetent physician registered in one province but unable to pass other provincial or Dominion registration examinations can, by paying a fee in England, become entitled to reciprocal registration in Great Britain. Then by an abuse of reciprocity he can demand registration in another province; and all this without leaving Canada. This is not as it should be.

E. J. R.

## QUEBEC

*Montreal Anti-Tuberculosis and Health League.*—Following an extensive anti-tuberculosis propaganda in the Montreal Star, Mayor Martin of Montreal called a mass meeting of citizens which was held at the Mount Royal Hotel on March 24th, when after statistical speeches had been given by Dr. Wodehouse of the Canadian Tuberculosis Association, and Drs. Frankel and Armstrong of New York, it was moved by Sir Arthur Currie, and seconded by Mr. Zephirin Hebert: "That this meeting of citizens of Montreal, convened on the 25th of March, 1924, by the Mayor, approves of the formation of an association for the betterment of public health to be known as 'The Anti-tuberculosis and General Health League.'" After the nomination of the memberships and executive, Mayor Martin read a letter from Lord Atholstan stating that he would immediately place at the disposal of the executive the sum of \$100,000 to be drawn as required for promotion of its work, and if this sum was judiciously used more would follow.

*To Equip Operating Room of Hospital.*—Announcement was made by Dr. H. L. Horsey, chairman of the ways and means committee formed by the Karnak Temple, Arab Patrol, in connection with the construction of the new hospital for crippled children by the Mystic Shriners, that Karnak Temple is equipping the operating room of the hospital, which will be opened in September. The new hospital will cost \$550,000 and will

accommodate 50 crippled children. No discrimination as to race or creed will be shown in the reception of patients. All work on the hospital will be carried out by members of Karnak Temple.

Dr. J. Alexander Hutchison has been appointed consulting surgeon to the Royal Victoria Hospital.

Dr. Gaudreault has been elected president of the Society Provancher D'Histoire Naturelle du Canada, in the City of Quebec.

Dr. Henry B. Gourlay, a member of the staff of the Vancouver General Hospital, died of pneumonia last month. He was a graduate of McGill in 1906, and spent two years as resident in the Montreal General Hospital.

Dr. J. B. Loring, formerly of Sherbrooke, Quebec, and a graduate of McGill University, has been elected president of the Chicago Ophthalmological Society.

The Medical Faculty of McGill University celebrates this year its centenary. The faculty, the first to be opened at McGill, was founded in the fall of 1824, and was the first medical school to be established in Canada. The anniversary therefore, also marks the centenary of medical education in the Dominion.

## ONTARIO

TOWN OF FOREST FINED FOR FAILING TO  
OBEY ORDER OF PROVINCIAL BOARD OF  
HEALTH, ONTARIO, REGARDING ESTAB-  
LISHMENT OF WATERWORKS

The town of Forest in the county of Lambton, Ontario, having been served with an Order of the Provincial Board to establish a system of waterworks, and having failed to obey the Order, was recently fined for this neglect by Police Magistrate Woodrow the sum of \$1,400 and costs. Since the conviction the council of the corporation has agreed to obey the order.

THE MEDICAL ALUMNI ASSOCIATION OF THE  
UNIVERSITY OF TORONTO

Toronto, April 7, 1924.

Dear Fellow-graduate:

The Annual Meeting for general business, the presentation of reports and elections of officers, will be held at the Chaudiere Golf Club, Ottawa, at 5.30 p.m., *Wednesday, June 18, 1924*. This will be followed by the Annual Dinner at 6.15 p.m. Arrangements will be provided for *Class Re-unions* at separate tables if desired. Graduates in medicine of the University of Toronto, (including Toronto School of Medicine, Trinity and Victoria), are urged to be present to renew old and make new acquaintances and recall the days of "auld lang syne." Tickets may be obtained at the time of registration for the Ottawa meeting of the Canadian and Ontario Medical Associations, or by writing the Secretary. Re-union Committee: D. A. Clark (Chairman), J. D. Courtenay, S. H. McCoy, J. A. Amyot, Geo. Campbell, Harold Courtenay (Secretary) Ottawa, and Robert T. Noble, Toronto. Kindly notify the Secretary of your intention to be present that a place may be reserved. All graduates in medicine who are not members of the Association are cordially invited to join up. Annual membership fee \$3.00; life membership \$50.00, which may be paid in five annual instalments of \$10.00 each. The above fees include membership in the Medical Alumni Association, the Alumni Federation and subscription to the University Monthly.

Yours fraternally,

HARLEY SMITH,  
Secretary.

H. B. ANDERSON,  
President.

THE ALUMNI FEDERATION OF THE  
UNIVERSITY OF TORONTO

Successor to the old Alumni Association of the University of Toronto. Assumes the functions of Convocation under the proposed amendment to the University Act. Raised and administers the University Memorial Fund from which \$164,000 has been loaned during the past five years to returned soldier students, \$50,074 being to medical students. Keeps the Alumni in touch with the University and with one another through the UNIVERSITY OF TORONTO MONTHLY. Endeavours to keep the work and needs of the University before the people with a view to securing generous support. Operates a Bureau of Appointments for graduate and undergraduate students. With the Board of Governors is sponsoring the Banting Research Foundation to provide adequate funds for medical research. Will nominate eight persons for appointment by the Lieutenant-Governor-in-Council to the Board of Governors of the University.

THE MEDICAL ALUMNI ASSOCIATION is one of the constituent units of the Alumni Federation. Co-operates with the Federation in all its activities. Considers and makes recommendations pertaining to the interests

of medical education, the graduates and the profession. Arranges general and class reunions of medical graduates.

Dr. William Lloyd Ritchie, Med., 10 Toronto, formerly of the Toronto General Hospital staff is amply justifying the experiment of St. Luke's Hospital and the Protestant Hospital, Ottawa in conjointly employing a full time radiologist. Trained by Dr. Lewis Gregory Cole of New York, Dr. Ritchie has become an indispensable aid to his colleagues in the Capitol city.

The bulletin of the Canadian Tuberculosis Association for March, 1924, contains the programme of the Canadian Tuberculosis Conference. This conference is to be participated in by the Department of Soldier's Civil Re-Establishment, the Canadian Tuberculosis Association, and by the Ontario Laennec Society. Papers, demonstrations and meetings for the dates of April 8th, 9th and 10th are given; they include addresses by the Hon. W. R. Motherwell, Hon. Dr. H. S. Beland and other members of Parliament, and by the leading workers in tuberculosis in the Dominion.

Publication No. 29, of the Department of Health in Ottawa in labelled "Simple goitre, a summary of facts for the physician," and includes the most necessary information as to the giving of iodine for the prevention of goitre, an extensive bibliography is appended.

Abstracts No. 20, 21, 22, 23, from the Department of Health at Ottawa, compiled by J. J. Heagerty, M.D., D.P.H., chief of the division of venereal disease control, are in the hands of the reviewer and certainly deserve notice. These booklets deal with disease control, the diagnosis and treatment of venereal disease, and are a distinct contribution to the service of public health. Excellent resums are given from many clinics in many countries, and discourses on the social side of venereal disease are simply and interestingly put before the practitioners. The prognosis of syphilis which occupies most of abstract No. 21, written by John A. Fordyce of New York, is an article highly deserving of the attention of every one. The division of venereal disease control is certainly to be complimented on their publications.

The Sulgrave Institute of New York had as their guests of honour on the 13th of April, Dr. F. G. Banting and Mr. C. H. Best. At the dinner which was given as part of the reception, a dinner at which the guests were in many instances diabetics returned to active life through insulin, a tribute was given to Dr. Banting and his co-worker by the American business world. Dr. Banting in reply to the toast of the evening studiously avoided reference to the clinical side of the work he has been so interested in, and contented himself with urging upon his hearers the necessity of a more intensive study of the principles of rest and afternoon tea.

Accompanying Dr. Banting was Professor Veleyn Henderson of the department of pharmacology of the University of Toronto, in whose laboratory Dr. Banting is conducting further experiments in his chosen line.

Dr. Thomas McCrae, Professor of Medicine, Jefferson College, Philadelphia, one of the best known graduates of the Toronto school, delivered an address to the graduating class of the University of Toronto medical school. Dr. McCrae was chosen this year to

deliver the Lumleian lectures before the Royal College of Physicians in London, taking as his subject "The question of foreign bodies in the bronchi and all passages."

#### OTTAWA'S NEW HOSPITAL

Ottawa will witness in the early autumn the opening of its new Civic Hospital beautifully situated in the midst of its twenty-three acres of grounds, facing the Central Experimental Farm.

To the west of the grounds, for the up-keep of which alone there is a bequest of \$200,000, and on the edge of a one and a half acre hardwood grove, is the nurses' home, connected with the hospital by a two hundred yard tunnel. It has two hundred and twenty-five single rooms provided with running water; and numerous sitting rooms, sun parlors, and balconies.

Behind the hospital and connected to it by a passage-

porches, which provide an abundance of delightful suburban air, and on the north a beautiful view of the Gatineau Hills. On the top of each wing is a roof garden. The interior is decorated in French grey in sunny sections shading gradually into buff in the less lighted parts of the building. At corridor intersections are the doctors' call systems surmounted by electric clocks operated from the Dominion Observatory.

The sixth floor is devoted to surgery. There are six well lighted operating rooms, each with suction and pressure taps, and to each of which is carried a piped supply of nitrous oxide and oxygen.

One entire floor of eighty-six beds is given over to obstetrics, with labour and delivery rooms centrally located.

The ground floor consists of pathological and x-ray departments, observation and psychopathic wards, and out-door clinics. There is a complete operating room in the out-door department. Underneath the ground floor



way five stories in height, is the service building containing the dining-rooms, kitchens, and store rooms. The upper floor of this building has sleeping quarters and sitting rooms with fire-places for a resident staff of twenty-one house doctors.

Behind the service building is the power plant and laundry. The latter is of nine hundred bed capacity, to allow for future expansion of the hospital. The upper floor of this building accommodates thirty-five male employees. To the west of the service building is a splendid residence with commodious balconies, for twenty-one house doctors.

The hospital block shown in the illustration is H-shaped and has five hundred and twenty-five beds. The ends of all wings consist of capacious balconies and sun-

is a system of tunnels connecting all the buildings, and permitting the leading of service trucks directly on to elevators for transit to ward kitchens without passage through the hospital corridors.

The equipment throughout is the most modern, and each detail has been carefully considered from the silent light nurses' call system to the miniature sanitary fixtures in the Children's Department.

The hospital which represents an expenditure of about \$4,000,000 is a monument to the Civic Hospital Commission—an honorary committee of public spirited citizens. It will be superintended by Dr. Donald M. Robertson, Med. '98 McGill, for many years Superintendent of the Protestant Hospital, who is in a large measure responsible for the colossal undertaking.

#### MANITOBA

In addition to the thousand dollars raised by members of the Faculty of Medicine and Manitoba Medical Alumni, the old Faculty of the Medical College has donated \$2,300 from funds at their disposal, and the College of Physicians and Surgeons has made a grant of \$1,700, bringing the total for the Prowse Prize Fund to \$5,000. This amount will be suitably invested and the proceeds given annually as a prize for clinical research.

the auspices of the Winnipeg Medical Society was delivered by Prof. J. B. Collip, Professor of Biochemistry in the University of Alberta on April 11th, 1924.

The film "The Reward of Courage," loaned by the American Society for the Control of Cancer has been shown in Winnipeg, Minnedosa, Carman, Virden, Shoal Lake, Emerson, Grandview, Dauphin, Killarney. It is estimated that 10,500 people saw the film. The whole of the literature sent to the Society was distributed in connection with the exhibition of the film.

The Gordon Bell Annual Memorial Lecture under

## ALBERTA

Dr. Emerson Smith, lecturer on genito-urinary surgery at the University of Alberta, is spending a few months in the clinic of Dr. Hugh Young, Baltimore.

Dr. C. G. Geggie, Edmonton, has gone to Paris and Vienna for 6 months to take post-graduate work in surgery.

The monthly meeting of the Edmonton Academy of Medicine was held in the Medical Building of the University on April 2nd, 1924.

Dr. Mayhood, representing the Calgary Medical Society, gave an interesting address on "Acute Empyema." Dr. B. R. Mooney presented a well-prepared paper illustrated with lantern slides on "An outline of the Physics and the Therapeutical Application of the Quartz Lamp."

Dr. Harold Orr, Dermatologist to the University Hospital, Edmonton, has returned from Europe. For the past 18 months he has been on the dermatological staff of the London Hospital.

## BRITISH COLUMBIA

The forthcoming convention of the Pacific Northwest Medical Association is assuming shape, under the able administration of the organizing committees appointed in charge of this work, and headed by Dr. A. S. Munro, President-elect of the Association. Eight hundred or more members are expected to attend, and the meeting is being held at a time when Vancouver will be the scene of several important conventions. Amongst these are the Pacific Coast Golf Tournament, which embraces the whole Pacific Coast from California north, and the North Pacific Paediatric Association. The week will also be signalized by the visit of the British Squadron of battleships which is touring the world. During the following week the Gyro Club is holding a great carnival and joy-week.

June is perhaps one of the most attractive months of the Vancouver season and to any who know Vancouver weather in summer time, no more need be said. The medical journal *Northwest Medicine*, published in Seattle, is devoting the May number to Vancouver, and descriptive articles have been prepared dealing with this.

The Executive Secretary, Mr. C. J. Fletcher, is on his annual tour through the interior, visiting medical men at all points, and acquainting them with the progress of the B. C. Medical Association, and the work of the year. Some weeks ago, he toured the southern part of Vancouver Island, and received a hearty welcome from the medical men of this district. Great interest is being taken by the profession in the study at present being made of Health Insurance for British Columbia.

The last monthly luncheon of the B. C. Medical Association which should have been held in March, was postponed out of respect to Dr. H. B. Gourlay, whose tragic death is mourned by the whole profession, and whose loss has inflicted a severe blow on medicine in British Columbia. Dr. Gourlay was one of the most competent surgeons in B. C. and was comparatively young when he died. He was undoubtedly at the threshold of a distinguished and successful career. A man of great personal charm of manner and of the most sterling integrity of character, he was regarded as a dear personal friend

by every medical man who knew him. The sympathy of the profession goes out to his widow and children. An obituary notice appears in another column.

Vancouver has been visited by an unusual amount of infectious disease during the last winter, especially scarlet fever and smallpox. Both diseases have been, fortunately, of a very mild type, but scarlet fever especially, has been wide-spread to a degree never before experienced in this city. The unfortunate policy of the ratepayers of Vancouver and surrounding municipalities, with regard to infectious disease accommodation, this policy consisting in a steady refusal to provide any accommodation beyond a few ramshackle sheds erected seventeen years ago, when Vancouver was a small town, has resulted in a highly dangerous situation, inasmuch as only a fraction of the cases occurring in the city can be taken care of in hospital, and cases occurring outside the city have practically no chance whatever of hospital care. It is only fair to the Vancouver General Hospital authorities to say that they have performed wonders with the limited accommodation at their disposal. One expedient has been the conversion of the nurses' lecture room into a women's ward for scarlet fever. It is hoped that at some future date, the municipalities of the lower mainland will awaken to the dangers of the present state of affairs.

The Vancouver Medical Association had the pleasure of receiving a visit from Dr. Blackford of Seattle, who came at short notice to fill a place on the programme of its last meeting, rendered vacant by the illness of Dr. Warren of Victoria. Dr. Blackford gave an excellent address on the work in gastro-intestinal diseases recently done by his clinic. He analyzed the diagnostic grouping of some 1,413 cases, and referred to the practical value of such analysis.

An interesting discussion followed at the end of the address.

This meeting closed the twenty-sixth annual session of the Vancouver Medical Association. The election of officers will take place at the end of the current month, a full list of nominations serving to indicate the sustained interest in the Society and its activities.

**A Case of Bilateral Renal Hemorrhage.**—Abraham Strachstein, New York, believes that his case was one of a bilateral papillomatous

pyelitis, the hemorrhages having been due to vegetations in the pelvis and calices.—*Jour. Am. Med. Ass.*, Dec. 22, 1923.



## The Association

# CANADIAN MEDICAL ASSOCIATION ONTARIO MEDICAL ASSOCIATION and CANADIAN SOCIETY OF ANAESTHETISTS

### CONJOINT ANNUAL MEETING

*Ottawa, June 17th to 20th, 1924*

#### WEDNESDAY, JUNE 18th

##### General Sessions

- 9.00 a.m.—Registration.
- 12.30 p.m.—Official Luncheon.
- 2.00 p.m.—Some Views on Prostatectomy—Sir John Thompson Walker, London, Eng.
- 3.00 p.m.—Bronchoscopy and Oesophagoscopy Medical and Surgical Cases of Interest. Illustrated.—Chevalier Jackson, Philadelphia.
- 4.00 p.m.—Addresses by delegates of the British Medical Association—Sir James Verrall, London.  
Dr. Alfred Cox, Medical Secretary, London.
- 8.00 p.m.—Public evening meeting under the patronage of their Excellencies Lord and Lady Byng of Vimy.  
Introduction of distinguished guests.  
Listerian Oration—Dr. John Stewart, Halifax.

##### Medical Section

- 9.30 a.m.—Basal Metabolism as an Aid in Diagnosis—Prof. J. J. R. Macleod, University of Toronto. Discussion opened by J. M. Rabinowitch, Montreal.
- 10.00 a.m.—Obesity—E. H. Mason, Montreal.

- 10.30 a.m.—Non-tuberculous Infections of the Thorax—A. H. Gordon, Montreal.  
Discussion opened by N. M. Harris, Ottawa.  
J. H. Elliott, Toronto.

- 11.15 a.m.—A Study of Fungi in Diseases of the Skin—H. A. Dickson, Toronto.

- 11.45 a.m.—Some Experiences in the Use of Quinidine — Harris McPhedran, Toronto.

- 12.00 a.m.—Hypertension in its Relation to Functional Activities of the Vascular System — Wm. Goldie, Toronto.

##### Surgical Section

- 9.30 a.m.—Diagnosis and Treatment of Chronic Ulcers of the Leg. Illustrated—R. E. Gabie, Toronto; O. Wilson, Ottawa; O. Klotz, Toronto. Discussion.

- 10.30 a.m.—Surgical Problems of the Acute Abdomen. Illustrated—A. Primrose, Toronto.

Some Clinical Aspects of Unsuspected Hypertoxic Appendicitis—E. St. Jacques, Montreal; F. W. Mowbray, Hamilton. Discussion.

- 11.10 a.m.—Acute Bone Lesions including Compound Fractures — C. Starr, Toronto; G. Wilson, Toronto; J. Murray, Ottawa. Discussion.

**Eye, Ear, Nose and Throat Section**

- 9.30 a.m.—Complications in Cataract Operations—C. E. Hill.  
Significance of Vestibular Tests in Intracranial Lesions—Gordon Wilson, Chicago.  
Tumours of the Superior Maxillary Karl Waldron, Minneapolis.  
Clinical Value of Gullstrand's Slit Lamp, with demonstration — A. Rosenbaum, Montreal.  
Address—subject to be announced —James Carfield Dwyer, New York.  
Some Aspects of Nasal Accessory Sinus Disease—J. K. M. Dickie, Ottawa.  
Observations on a Case of Sympathetic Ophthalmia of Some Four Years' Standing — S. Hanford McKee, Montreal.

**Obstetrical and Gynaecological Section**

- 9.30 a.m.—Some Aspects of Postoperative, Abdominal and Gynaecological Operative Surgery — McKelvey Bell, New York.  
10.00 a.m.—Address—subject to be announced —Fred Marlow, Toronto.  
10.30 a.m.—Chorio-Epithelioma of the Uterus and other Allied Tumours—James Miller, Kingston.  
10.50 a.m.—Prolapsus Uteri—W. W. Chipman, Montreal.  
11.20 a.m.—Address—subject to be announced —Ernest Williams, London.  
11.40 a.m.—Address—subject to be announced —H. Burgess, Montreal.

**Paediatric Section**

- 9.30 a.m.—The Child of the Poor—A. B. Chandler, Montreal.  
9.45 a.m.—The First Half Decade—W. R. Coles, Regina.  
10.00 a.m.—Discussion.  
10.10 a.m.—Epidemic Glandular Enlargement in Children—H. Spohn, Vancouver.  
10.25 a.m.—Pyelitis—V. B. Dowler, Fort William.  
10.40 a.m.—Discussion.  
10.50 a.m.—Sensitization of Infants to Cow's Milk Protein — F. F. Tisdale, Toronto.  
I. H. Erb, Toronto.

11.05 a.m.—Discussion.

- 11.15 a.m.—Modern Tendencies in Infant Feeding—Alton Goldbloom Montreal,  
11.30 a.m.—Use of Lactic Acid Milk—R. R. Struthers, Montreal.  
11.45 a.m.—Some Problems in Breast Feeding —L. M. Lindsay, Montreal.  
12.00 a.m.—Discussion.  
12.30 a.m.—Congenital Deficiency of the Small Intestine. Case Report—R. R. MacGregor, Kingston.

**THURSDAY, JUNE 19th****General Sessions**

- 11.00 a.m.—Diabetes—E. P. Joslin, Boston.  
Discussion—W. T. Connell, Kingston; J. J. R. Macleod, Toronto.  
12.30 p.m.—Official Luncheon.  
1.30 p.m.—Annual Meeting Canadian Medical Protective Association.  
2.00 p.m.—The Healthy Heart and Diagnosis —John Parkinson, London.  
3.00 p.m.—Effects of Several of the Common Gynaecological Operations on the Future Childbearing Woman—J. A. Polak, New York.  
4.00 p.m.—Garden Party.  
8.00 p.m.—Annual Banquet Canadian Medical Association, Chateau Laurier Hotel.

**Medical Section**

- 9.00 a.m.—The Use and Abuse of Iodine in the Treatment of Goitre—Duncan Graham, Toronto.  
Discussion opened by J. Oille, Toronto.  
9.15 a.m.—Leprosy in Canada—J. D. Page, Ottawa.  
9.30 a.m.—Address—subject to be announced S. A. Kinnear Wilson, London, Eng.  
Discussion opened by Colin Russel, Montreal.  
10.30 a.m.—The Role of the Bone Marrow in Primary Blood Diseases—A. G. Nicholls, Halifax.  
Discussion opened by W. T. Connell, Kingston.

**Surgical Section**

- 9.00 a.m.—Chronic Lesions of the Breast—Symposium—Roscoe Graham, Toronto; F. Etherington, Kingston; A. T. Bazin, Montreal. Discussion.
- 9.40 a.m.—Empyema—A. L. Lockwood, Toronto; Edward Archibald, Montreal; A. J. Grant, London, Eng. Discussion.
- 10.20 p.m.—Haematuria—Sir. J. Thompson, Walker, London; David Mackenzie Montreal; L. J. Austin, Kingston. Discussion.

**Paediatric Section**

- 9.00 a.m.—Habitual Vomiting in Children—R. T. Rorke, Winnipeg.
- 9.15 a.m.—Otitis Media—R. P. Smith, Hamilton.
- 9.30 a.m.—Discussion.
- 9.40 a.m.—Enlarged Thymus in Acute intestinal Intoxication—T. G. Drake, Toronto.
- 9.45 a.m.—Diagnosis and Treatment of Holding Breath Spasm in Infancy and Childhood—Alan Brown, Toronto; A. H. Rolph, Toronto.

10.10 a.m.—A Consideration of the Etiology of Rheumatic Endocarditis — A. P. Hart, Toronto.

10.25 a.m.—The Prevention and After Care of Heart Disease in Children—H. P. Wright, Montreal.

10.40 a.m.—Discussion.

10.50 a.m.—The Use of Convalescent Serum in Scarlet Fever—H. B. Cushing, Montreal.

11.05 a.m.—Discussion.

**FRIDAY, JUNE 20th****General Sessions**

9.00 a.m.—Tolerance and Intolerance as Factors in the Epidemiology of Tuberculosis — L. Cummins, Cardiff, Wales.

10.00 a.m.—Subject to be announced—Edward Archibald, Montreal.

10.30 a.m.—Address—subject to be announced —C. D. Parfitt, Gravenhurst.

11.00 a.m.—Some X-ray Features in Connection with Tuberculosis—

11.30 a.m.—Sciatica—J. A. Nutter, Montreal.

**CANADIAN SOCIETY OF ANAESTHETISTS****FOURTH ANNUAL MEETING***Preliminary Programme*

Professor Macleod—Toronto University.  
The Chemical Control of Respiration.

Professor Lloyd—McGill University.  
Further Studies in the Theory of Narcosis.

Professor Hendrys—Toronto University.  
Colonic Absorption of Ether as an Anaesthetic in Labour.

Dr. Norman Gwyn—Toronto.  
Chest Complication in Surgery.

Dr. Wm. Webster—Winnipeg.  
Title to be announced later.

Dr. Samuel Johnston—Toronto.  
The bearing of Basal Metabolism on Anaesthesia.

Dr. Fraser B. Gurd, Montreal.  
Anaesthesia for Intra-thoracic Surgery.

Dr. Wesley Bourne—Montreal.  
Further Studies on Effects of Anaesthetics at Various Environmental Temperatures.

Dr. Chas. Robson—Toronto.  
Anaesthesia in Children.

Dr. Easson Brown—Toronto.  
Further Studies in Anaesthetic Gases.

Dr. G. M. Geldert—Ottawa.  
Nitrous-Oxid Anaesthesia for the Cystoscopy.

Dr. McCaughey—Ottawa.  
Nitrous-Oxid Oxygen Analgesia in Cavity Preparation.

Dr. Muir will give the Presidential Address.  
The Address of Welcome will be rendered by some prominent Government official of Ottawa. The annual banquet will be a very special feature this year. Arrangements for the entertainment of the ladies have been made.

## Canadian Medical Association

## CONSTITUTION AND BY-LAWS

## ARTICLE I.—TITLE

This Association shall be known as the Canadian Medical Association.

## ARTICLE II.—PURPOSES AND OBJECTS

The purposes and objects of the Association are:—

- (a) To cultivate the science of medicine and surgery;
- (b) To advance the character and honour of the medical profession;
- (c) To further unity and harmony among its members;
- (d) To ensure the observance of legal duties and obligations imposed on the profession in medical matters by the different statutes or the principles of ethics to be established by the Association;
- (e) To promote the public health;
- (f) To elevate the standard of medical and nursing education, both undergraduate and post-graduate;
- (g) To conduct or assist in the conducting of clinics;
- (h) To assist in the advancement of medical legislation for the good of the public and of the profession;
- (i) To study and to advance by any means in its power the improvement and standardization of hospitals;
- (j) To conduct or assist in conducting research work in connection with the different medical problems that from time to time confront the profession;
- (k) To raise by subscription from public and private bodies or persons, and in any other proper or legal manner, funds for the proper carrying out of the objects herein contained, and to expend the moneys so raised in the furtherance of these objects; and, to establish any necessary trusts for the better carrying out of the foregoing;
- (l) To establish such committees as may be advisable for the carrying out of these objects, and to delegate any necessary powers of the Association to such committees;
- (m) To serve humanity and the medical profession by investigation, study and research work in connection with all matters in which the profession can properly interest itself and to do any necessary act or thing in the premises;
- (n) To establish such branches as may be considered advisable or necessary;
- (o) To publish or assist in publishing any journal dealing with medicine or allied sciences;
- (p) And such other lawful things as are incidental or conducive to the welfare of the public and of the medical profession.

## ARTICLE III.—ETHICS

The Code of Ethics of the Association shall be such as may be adopted by the Association from time to time. An official copy shall be kept in the possession of the Secretary and shall be open to inspection at all times. A copy shall be supplied to all members of the Association.

## ARTICLE IV.—MEMBERSHIP

The Association shall be composed of ordinary, associate and honorary members.

Ordinary members shall be (a) regularly qualified medical practitioners resident in Canada; (b) members of the Army and Navy Permanent Medical Services in Canada; and (c) graduates in medicine engaged in teaching or research in Canadian Institutions.

Associate members shall be regularly qualified medical graduates of good standing residing outside of Canada.

Honorary members shall be persons who have distinguished themselves and have risen to eminence in medicine or the allied sciences.

Senior members shall have attained the age of 70 years and shall be elected by unanimous vote of Council present and voting.

## ARTICLE V.—BRANCH ASSOCIATIONS

The Provincial Association in each province may, by special resolution of such Association, become a branch of the Canadian Medical Association by subscribing to its Constitution, By-Laws and Code of Ethics, and by securing the approval of the Council. They shall submit to Council a copy of their Constitution and By-Laws and such amendments as may be made from time to time.

## ARTICLE VI.—AFFILIATED SOCIETIES

Any nationally organized Medical, Scientific or Sociological Body may become affiliated with the Canadian Medical Association by securing the approval of the Council. They shall submit a copy of their Constitution and By-Laws and such amendments as may be made from time to time.

## ARTICLE VII.—MEETINGS

The meetings of the Association shall be held annually, and on such other occasions as may be considered desirable by the Council, time and place to be determined by the Council.

## ARTICLE VIII.—OFFICERS

The officers of the Association shall be a President, a President-elect, a Vice-President for each Province, a Chairman of the Council, a General Secretary and a Treasurer.

## ARTICLE IX.—THE COUNCIL

The Council shall consist of:—

- (a) The officers;
- (b) Delegates elected by the Provincial Branch Associations, as follows:—  
Each Provincial Branch Association shall be entitled to elect, in addition to its President and Secretary, or Joint Secretaries, three delegates to serve on the Council, for its membership in the C.M.A. of from fifteen to fifty; four delegates for its membership from fifty-one to one hundred; five delegates for its membership of from 101 to 300; and, thereafter, one delegate for every 300 of a membership above 300.
- (c) One delegate for each affiliated medical, scientific or sociological body.
- (d) Chairmen and Secretaries of Association Committees;
- (e) Chairmen of scientific sections of the Association.

## ARTICLE X.—COMMITTEES

The committees shall be (a) Standing; (b) Special.

- (a) The Standing Committees shall be appointed by the Council:—  
(1) The Executive Committee;
- (2) The Committee in Charge of the Legislative Bureau;
- (3) The Committee on Medical Education;
- (4) The Committee on Necrology;



- (5) The Committee on Constitution and By-Laws;
  - (6) The Committee on Intra-Canadian Relations;
  - (7) The Committee on Publicity;
  - (8) The Committee on Ethics and Credentials;
  - (9) The Committee on Public Health;
  - (10) The Committee on Economics;
  - (11) The Committee on Pharmacy.
- (b) Special Committees may be appointed, (a) by the President; (b) by the Council; (c) by the Executive Committee.

#### ARTICLE XI.—FUNDS

Funds for the purposes of the Association shall be raised by an annual fee from each ordinary member, the amount of such fee to be determined by the Council; from the Association's publications, and in any other manner approved by the Council.

#### ARTICLE XII.—THE ASSOCIATION YEAR

The Association Year shall be the calendar year.

#### ARTICLE XIII.—AMENDMENTS

The Constitution may be amended provided notice of motion is placed in the hands of the General Secretary six months before the date of the annual meeting. Amendments may be suggested by the Executive Committee without notice of motion. The proposed amendments must be published in the *Journal* in the two issues preceding the annual meeting. No amendment shall become effective until sanctioned by a two-thirds vote of the Council present and voting.

#### BY-LAWS

##### CHAPTER I.—MEMBERSHIP

*Section 1.*—Any physician residing in Canada may be elected by the Council an *Ordinary Member* of the C.M.A. provided that,

(a) He is a member in good standing in his Provincial Association; except that, where no such Association is organized, he may be elected by Council after being nominated by two members in good standing in the Association; and,

(b) He pays the annual fee and subscribes to the Constitution and By-Laws and Code of Ethics of the Association. If by March 31st the annual fee for the current year has not been paid, membership automatically lapses and the *Journal* is discontinued. Reinstatement at any time during the current year may be obtained by payment of the current fee.

*Section 2.*—*Associate Members* may be elected by the Council from amongst regularly qualified medical graduates residing outside of Canada. Associate members shall have no voting power and shall not be called upon to pay any fees.

*Section 3.*—*Honorary Members* may be nominated by any member of the Association and shall be elected only by unanimous vote of the Council present and voting. Not more than five honorary members may be elected in any one year, and, at no time shall the list of living honorary members exceed twenty-five. Honorary members shall enjoy all the rights and privileges of the Association, but shall not be required to pay an annual fee.

*Section 4.*—*Senior (Life) Members*—Any member of the Association in good standing who has attained the age of 70 is eligible to be nominated by any other member of the Association in good standing for senior membership, but shall be elected only by the unanimous vote of the Council present and voting. Not more than ten such senior members may be elected in any one year. Senior members shall enjoy all the rights and privileges of the Association, but shall not be required to pay any annual fee.

*Section 5.*—So long as a member conforms to the Constitution and By-Laws and Code of Ethics, he shall retain his membership and have all the privileges and powers thereof, provided that any member whose annual fee shall not have been paid on or before the 31st day of March of the current Association year, shall, without prejudice to his liability to the Association, be suspended from all privileges of membership. Any member whose name has been removed from his Provincial Medical Association for unprofessional conduct, shall, upon representation from such Association to the Council, have his name removed from this Association.

*Section 6.*—No member shall, except in case of his death, or expulsion, or of his ceasing to be a member under the previous provisions of this chapter, cease to be a member without having given notice in writing, to the General Secretary of the Association not less than one month before his next annual fee is due, of his intention in that regard, and having paid all arrears of fees due by him.

*Section 7.*—Any delinquent member having once failed to comply with the sections of this article shall not be restored to membership until all such dues, as may be determined by the Council, have been paid, and satisfactory evidence produced that he retains his membership in a Provincial Branch, if admitted through such channel.

*Section 8.*—No member shall take part in the proceedings of the Association, nor in the proceedings of any of the sections thereof until he has properly registered and paid his annual dues for that and previous years.

##### CHAPTER II.—GUESTS AND VISITORS

*Section 1.*—Medical practitioners and other men of science residing outside of Canada may attend the annual meeting as guests of the President or of the Council, or as visitors when vouched for by the General Secretary. They shall register with the General Secretary without payment of fee and may, after proper introduction, be allowed to participate in the discussions of a purely scientific nature.

*Section 2.*—Lay members of affiliated associations or societies may, upon invitation by the President, attend the Annual Meetings and participate in the discussions of a purely scientific nature.

*Section 3.*—Medical students may be admitted as visitors to either the general meetings or to the meetings of any of the sections thereof, but shall not be allowed to take part in any of the proceedings. They shall be vouched for by a member of the Association to either the President or the General Secretary.

##### CHAPTER III.—ANNUAL MEETINGS

*Section 1.*—The place of meeting shall be decided upon by the Council, and shall be announced as early as possible.

*Section 2.*—When the C.M.A. meets in any Province where there is a branch Association, the meeting shall be held in conjunction with the Branch Association, and the local Association or Society shall have control of the arrangements under the direction of the Medical Association of the Province and the General Secretary of the C.M.A.

*Section 3.*—The meetings shall consist of general sessions and scientific sections.

*Section 4.*—The President shall preside at all general meetings. In his absence, or upon his request, one of the Vice-Presidents shall preside.

*Section 5.*—The Rules of Order which govern the proceedings of the House of Commons of Canada shall

be the guide for conducting all meetings of the Association.

#### CHAPTER IV.—MEETINGS OF SECTIONS

*Section 1.*—The sections to be held at any Annual Meeting shall be determined by the Council.

*Section 2.*—The Chairman and Secretary for each section shall be appointed by the Association or Society in charge of the annual meeting.

*Section 3.*—The Chairman shall preside at all meetings of the section, and with the aid of the Secretary, shall arrange for the papers and others business of the section.

*Section 4.*—The Secretary shall keep a correct account of the transactions and record them in a special minute book provided by the General Secretary. The Chairman must verify and sign the minutes which must be returned to the General Secretary at the close of the meeting.

#### CHAPTER V.—ELECTION OF OFFICERS

*Section 1.*—Any five members of the Association may hand to the General Secretary, in writing, not later, than the first day of the annual meeting, the name of a member whom they may wish to nominate for any office.

*Section 2.*—The President Elect, after nomination shall be elected by the Council. Other officers of the Association shall be appointed by the Council.

#### CHAPTER VI.—DUTIES OF OFFICERS

*Section 1.*—The President shall preside at the general sessions of the Association and shall perform such duties as custom and parliamentary usage require. He shall deliver a Presidential Address. He shall be a member ex-officio of all committees.

*Section 2.*—The President-elect shall assume office at the close of the first general session of the next annual meeting following his election.

*Section 3.*—The Vice-President shall assist the President in the performance of his duties. The Vice-President of the Province in which the meeting is held shall be the 1st Vice-President of the Association for that year.

*Section 4.*—The General Secretary shall be also the Secretary of the Council and also of the Executive Committee of the Association. He shall give due notice of the time and place of all annual and special general meetings, by publishing the same in the official journal of the Association, or if necessary, by notice to each member. He shall keep the minutes of each meeting of the Council and the Executive Committee, in separate books, and shall provide minute books for the secretaries of the different sections which he shall see are properly attested by both chairmen and secretaries thereof. He shall notify the officers and members of Committees of their appointment and of their duties in connection therewith. He shall conduct all correspondence of the Association and shall publish the official programme of each annual meeting. He shall preserve and index the archives, the public transactions, essays, papers, and addresses of the Association, and shall perform such other duties as may be required of him by the President, the Council, or the Executive Committee. All his legitimate travelling expenses shall be paid for him out of the funds of the Association, and he shall receive for his services a salary to be determined by the Council.

#### SECTION 5.—THE TREASURER

1. Shall receive and collect from the members the annual fees and demands of the Association.

2. He shall be the custodian of all moneys, securities and deeds, the property of the Association.

3. He shall pay by cheque only—such cheques to be countersigned by Chairman of Council or other authorized officer of the Association and covered by voucher.

4. He shall prepare an annual financial statement audited by a chartered accountant.

5. He shall furnish a suitable bond for the faithful discharge of his duties, the cost of which shall be borne by the Association.

6. He shall receive for his services an honorarium to be determined by the Council. He shall be reimbursed for his legitimate travelling expenses incurred in attending the annual meeting.

The Chairman of Council shall preside at all meetings of the Council. He shall be reimbursed for his legitimate travelling expenses incurred in attending the annual meeting.

#### CHAPTER VII.—THE COUNCIL

*Section 1.*—The Council shall meet at least two days previous to the opening of the Annual Meeting of the Association; and thereafter while the Association is in session, the Council shall meet daily. During the interval between the Annual Meetings, the Council shall meet at the call of the Executive Committee.

*Section 2.*—For all meetings of the Council, due notice shall be sent to each member stating the business of the meeting.

*Section 3.*—The Council shall have supervision of all properties and of all financial affairs of the Association. It shall, through its officers, conduct all the business and correspondence. It shall keep a record of the transactions of all its meetings and of the receipt and expenditure of all funds, and shall report upon the same in the *Journal* after the Annual Meeting. In the case of a vacancy in any office, on account of death or otherwise, during the interval between the Annual Meetings of the Association, it shall have the power to appoint successors. Before the close of each Annual Meeting, it shall elect a President-elect, select a place for the next Annual Meeting, and present a list of all standing and special committees and the members thereof.

*Section 4.*—In order that the business of the Association may be facilitated during the interval between its Annual Meetings, the Council shall appoint a committee of ten from among its members, which shall be known as the Executive Committee, which shall meet before the close of the Annual Meeting at which it is elected, and elect its own Chairman. In all the business affairs of the Association, it shall represent the Council, and to it shall be delegated all the rights and powers of the Council. The President and President-elect shall be *ex-officio* members of the Committee. The Executive Committee shall report to the Council at the Annual Meeting and at such other times as the Chairman of the Council may request. The Chairman of the Council, at the request of five members of the Council, may call a special meeting at any time, at which the Executive Committee may be annulled or changed, and for such other purposes as intimated in notice of meeting.

*Section 5.*—The Executive Committee may, if necessary, refer important questions for mail ballot to the Council.

#### CHAPTER VIII.—COMMITTEES

*Section 1.*—The Executive Committee.—In addition to the duties assigned in Section 4, Chapter VII, this Committee shall have charge of the publication of the official *Journal* of the Association, and of all published proceedings, transactions, memoirs, addresses, essays, papers, programmes, etc., of the Association.

As its first meeting each year, (Sec. 4. By-Law VII) it shall appoint an Editor and a Managing Editor of the

official Journal, shall define their respective duties and fix their salaries; shall appropriate a sum from the funds of the Association which shall be available during the ensuing fiscal year for the purposes of the Editorial Board.

The Editor shall be an *ex-officio* member of Council and shall present an annual report to that body.

The managing Editor shall be an *ex-officio* member of Council and of the Executive Committee and shall present an annual report and also an interim report at each meeting of the Executive Committee.

The Editor and Managing Editor acting jointly shall appoint such assistants as may be deemed necessary for the proper conduct of the official Journal; shall fix their remunerations within the limits of the appropriated funds, and shall define their duties.

The Executive Committee shall appoint the auditor and shall have the accounts of the Treasurer audited annually or more often if desirable, and shall make an annual report on the same to the Council. The Executive Committee may meet when and where they may determine, and the Chairman shall call a meeting on the request in writing of any three members. Five members of the Committee shall constitute a quorum for the transaction of business.

**Section 2.**—To the Committee in charge of the Legislative Bureau shall be referred all matters pertaining to Provincial and Federal Medical Acts. It shall report on all legislation relating to medical affairs in the various governments, and upon all like matters proposed by medical councils or licensing bodies.

**Section 3.**—To the Committee on Medical Education shall be referred all matters pertaining to medical colleges and medical education. It shall report upon the condition of medical education throughout Canada and upon any proposed change, and suggest methods for the improvement of medical education.

**Section 4.**—To the Committee on Necrology shall be assigned the duty of collecting, as far as possible, the obituaries of members dying since the last annual meeting.

**Section 5.**—To the Committee on Amendments to the Constitution and By-laws shall be referred all matters relating to the subject, before action thereon is taken by the Council.

**Section 6.**—To the Committee on Credentials and Ethics shall be assigned the duty of considering every application for membership, enquiring into all credentials presented, and reporting upon the fitness for membership of every applicant. To this Committee all questions connected with ethics shall be referred; they shall also report each year any violation of the Code of Ethics by any member which attracts their attention as affecting the Association.

**Section 7.**—Committee on Public Health.—It shall be the duty of this Committee to place itself in communication with the Federal Board of Health, and with the various affiliated societies, and where none exist, with the prominent men of the profession, seeking information regarding the above-named subjects, and to present a report embodying anything in regard thereto that would be of interest.

**Section 8.**—To the Committee on Pharmacy shall be referred all matters relating to standardization of drugs and the examination of pharmaceutical preparations for the proper protection of the public and of the profession.

**Section 9.**—It is the duty of the Committee on Intra-Canadian Relations to endeavour to promote in the different provinces of the Dominion, a better understanding of each other's problems, thus making for a greater bond

of sympathy and a stronger feeling of unity and cooperation among the members of the profession throughout the Dominion.

**Section 10.**—It shall be the duty of the Publicity Committee to study, investigate and make reports to the Association on points of interest to the medical profession; and to seek to inform the public through their daily press or otherwise on the progress of modern scientific medicine.

**Section 11.**—It shall be the duty of the Committee on Economics to study and report upon all matters of an economic nature, affecting the welfare of the medical profession.

**Section 12.**—Special Committees may, from time to time, be appointed by the President, the Council or by the Executive Committee. They shall select their own chairman and shall perform the duties for which they are called into existence.

**Section 13.**—Each Committee shall assume such other duties as may be assigned to it by the President or the Council, or the Executive Committee. They shall make progress reports to the Executive Committee at each of the meetings of that body or at any time they may be required by the Chairman of the Council. They shall send a report in writing to the General Secretary at least two months prior to the annual meeting of the Association.

**Section 14.**—Reports of all Committees shall be printed and mailed to all members of the Association at least two weeks before the annual meeting.

**Section 15.**—No Committee shall expend any moneys nor incur any indebtedness nor obligation without the sanction of the Executive Committee.

#### CHAPTER IX.—ADDRESSES AND PAPERS

**Section 1.**—All addresses delivered at an Annual Meeting shall immediately become the property of the Association, to be published or not, in whole or in part, as deemed advisable, in the Journal of the Association.

Any other arrangements for their publication must have the consent of the author or of the reader of the same and of the Executive Committee.

**Section 2.**—All papers, essays, photographs, diagrams, etc., presented in any section, shall become the property of the Association, to be published in the official Journal of the Association or not, as determined by the Executive Committee, and they shall not be otherwise published except with the consent of the author and of the Executive Committee.

**Section 3.**—Each author of a paper read before any section shall, as soon as it has been read, hand it with any accompanying diagrams, photographs, etc., to the Secretary of the Section before which it has been presented, who shall endorse thereon the fact that it has been read in that section, and shall then hand it to the General Secretary.

#### CHAPTER X.—REFERENCE TO THE ASSOCIATION

Upon the request of 10% of the members in good standing present at an Annual Meeting, the President shall direct that any business transacted by the Council be submitted to a general business meeting of the Association.

#### CHAPTER XI.—AMENDMENTS

Amendments may be offered by any member of the Council and should be in the hands of the General Secretary three months before the Annual Meeting and published once in the Journal.

## Financial Page

### INVESTMENTS

Income to a large degree reflects the measure of success to which an individual attains in his chosen field of human endeavour. But the individual's investments reflect the use to which he has put his income. Broadly speaking, no man can be entirely successful who does not save a fixed portion of his income and make it work as hard for him as he has worked to acquire it. The ability to save is the watermark of the successful man.

Perhaps in no other profession or business do so many elements conspire against systematic saving, as in the medical profession—and perhaps in no other profession is it so badly needed.

A doctor's income is entirely dependent upon his own efforts—his ability to stand up under heavy strain. Unlike other men, who can surround themselves with capable assistants and profit by their efforts, he must depend for his income upon his own capacity for work. A time will come in his life when he will reach the peak of his earning power—after which, with advancing years, his earned income will gradually decline. It is, therefore, essential that a sufficient sum be saved in the prosperous years, and wisely invested, to ensure an independent income.

The medical student spends many years of his life preparing himself for the practice of his profession. This time is spent at an age when he readily absorbs knowledge; he learns to remember and classify facts and theories—but, all these facts, all these theories, and all his efforts are in one groove—the alleviation of human suffering—they are no help to him in the management of his financial affairs.

Then again, a doctor's life is most strenuous. He has no fixed hours of work, of study, of leisure—he is

a human benefactor—and like an electric light is expected to report on duty “whenever a button is pushed.” As a rule, he cannot make a study of investments. First, because he usually has so many other people's troubles on his mind that he has no time for his own, and secondly, because his training has been in a different groove. Here and there, of course, will be found men of outstanding ability both in the profession and in business, but they are only the exceptions that prove the rule. Few men in business ever try unaided to operate in different lines. They may put their money into different propositions, but only under the direct supervision of men in whom they have confidence; men who have made a study of, and been successful in, their own chosen fields.

Too many, burdened with a multitude of cares, tired from overwork and irregular hours, having faith in their own ability to produce, take long chances. They listen to arguments put forth by salesmen of speculative securities, take in all they have to say of possible profits, overlooking the fact that safety is the prime essential of an investment, and that there are not many propositions at which one can make even 7% with safety.

There is, therefore, only one thing for a professional man to do. He should plan a definite savings programme of a fixed percentage of his income. If it is irregular, then when it is coming in, set aside a larger amount, but he should not let a year go by without saving the sum planned. Then let him be advised to place his funds in an investment that is safe—let him go to a Financial House of established reputation. Let him follow their advice and be content to receive a fair return on his money—and to know that it is safe.



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## Book Reviews

**Thyroid and Thymus.** By Andre Crotti, M.D., F.A.C.S., LL.D. Formerly Professor of Clinical Surgery and Associate Professor of Anatomy, Ohio State University. Second edition. Pp. 774, 7½ x 10½ inches with 105 illustrations and 39 plates in colours. Price \$18.00. Philadelphia, Lea & Febiger, 1922.

This is a most comprehensive monograph dealing with the thyroid and thymus in health and disease. The anatomy, histology and embryology are fully dealt with in the early part of the work; then follows the physiology, biological chemistry and pathology, leading up to the clinical side of the work. The etiology, symptomatology, diagnosis with the treatment of their disorders, both medical and surgical, are described in a comprehensive manner. Tumours, endemic goitre, cretinism, thymic death, status lymphaticus and other conditions due to organic or functional changes in the glands are fully discussed. The former edition has been revised thoroughly and new chapters added, making the work almost monumental and bringing it well up to date. The literature of the various divisions of the subject has been fully drawn upon. The physician or surgeon who wishes a reference book on the subject of these glands in health or disease will find here what he requires.

The author, after critically reviewing the theories regarding the etiology of endemic goitre presents the following conclusions:

1.—We can accept as an established fact that the goitre causative factor, whatever its nature may be, is most frequently conveyed to the organism through drinking water.

2.—The activity of the goitre causative factor is of an evanescent and fleeting character. It is destroyed by ebullition, materially diminished by filtration, and loses its goitrogenous power when exposed for a certain time to the air. The goitrogenous power of water allowed to stand in reservoirs is far more marked at the bottom of the body of water than at the top.

3.—Heredity is an important factor in the etiology of goitre.

4.—Theories seeking to establish a correlation between certain geological formations and endemic goitre are no longer dependable. The same is true for the theories claiming that lime, magnesium, metalliferous rocks, chalk, etc., must be regarded as causative factors. Goitre is found in every latitude and in low as well as in high altitudes.

5.—Although very clever, Repin's or the Plutonian Theory is purely hypothetical.

6.—There is no causal relation between radio-activity of certain waters and goitre.

7.—There seems to be enough evidence to show that goitre is not propagated by contact.

8.—In view of the small proportion of persons affected and the higher percentage of females, the belief of some authors that goitre is due to a deficiency of iodine in certain geographic areas is hardly acceptable.

9.—The beneficial effect of iodine observed in the treatment of goitre is to be compared to the beneficial effect of mercury in the treatment of syphilis. Its inefficiency in the treatment of well-established goitres of colloid nature can be explained by assuming that the colloid state is due to the pathological influence upon the gland of the goitre-causative agent. When once established it becomes permanent. It is, so to speak, a by-product of the pathological activity of the gland caused by the goitre-causative factor.

10.—So far the weight of evidence seems to be

in favour of the "infection theory."

His conclusion regarding the etiology of Graves' disease is that it is a form of toxic thyroiditis. It is caused by any infectious disease, by any toxic condition arising from a disturbed polyglandular function, by a disturbed nervous equilibrium, by a disturbed metabolism, etc. Under such conditions the thyroid secretion is quantitatively and possibly qualitatively affected, and becomes the cause of the pathological syndrome. The symptoms observed in Graves' disease are due to hyperthyroidism, to disturbances of the nervous and polyglandular systems, and probably some are due to anaphylaxis. The exact chemical reaction which takes place in order to bring about the whole syndrome is still a matter of speculation. It is most likely due to a disturbed condition of dispersion of the iod-colloid in the blood.

It seems strange that in the bibliography of the thyroid the name of Basedow has not been included, and that under Graves the only reference is to his *System of Clinical Medicine*, 1843.

There is a fifty-four page index bibliography and an index of authors as well as subject index. The book is a credit to the publishers who well deserve the kindly references of the author. The illustrations, whether of the anatomy, microscopy, clinical manifestations or surgery of the organs leave little to be desired. The whole work is a splendid example of the bookmaker's art.

J. H. E.

**The Medical Clinics of North America; 1923-1924 Series.** Vol. 7, No. 4. University of Kansas Number. Pp. 1051-1364. Figs. 172 to 238. Cloth \$16.00 per year (6 numbers), Paper \$12.00. Philadelphia and London, W. B. Saunders Company, 1924.

This number has twenty-three contributors, members of the staff of Kansas City Hospitals and of the University of Kansas. Numerous interesting case reports and monographs on special subjects are included in the papers presented. A number of the papers are well illustrated. The standard of the clinics is well maintained.

J. H. E.

**The Insulin Treatment of Diabetes Mellitus.** By P. J. Cammidge, M.D. Crown 8vo, pp. viii, 172. Price 6s. Edinburgh, E. & S. Livingstone, 1924.

This little volume has been prepared by the author as a concise summary of our present knowledge of the properties, mode of action, sphere of usefulness and practical application of insulin in diabetes. With his great clinical knowledge of diabetes and his laboratory researches he speaks with authority and this handbook should find a welcome. He believes that insulin is the greatest discovery yet made in connection with the treatment of diabetes. He points out that though its effects are often striking and dramatic, it has its limitations and its dangers. It is a powerful remedy which must be used with great care and discretion. It is not a universal or specific cure for diabetes, and fifty per cent. of diabetics can be treated quite satisfactorily without the use of insulin. The volume is full of practical hints for the proper application of insulin.

J. H. E.

**Lectures on Endocrinology.** By Walter Timme, M.D., Professor of Nervous and Mental Diseases, Poly-clinic Medical School. 8vo. pp. x + 123, 27 illustrations. Price \$1.50. New York, Paul B. Hoeber Inc., 1924.

This small volume is a reprint with corrections of an article appearing in *Neurological Bulletin*, Vol. iii,

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**Intramuscular treatment.** First injections twice a week. Begin with 18 centigrammes, increase rapidly up to 42 to 60 centigrammes. 1 cc. of water for 6 centigrammes of the drug. Inject very slowly in the buttock or the dorsi-lumbar muscles.

**Hypodermic treatment** for sucklings, children, old and weak people. Give first small doses at short intervals, increase progressively at longer intervals as tolerance is established, to one centigramme per kilogramme. 1 cc. of water for 5 or 6 centigrammes of the drug. Inject slowly in the flanks, in the back, between the scapulae. There is no pain if the drug is injected well under the skin and in sufficient dilution.

**Intravenous treatment** Begin with 6 centigrammes and repeat the five first injections every three days and after (from 36 centigrammes) every 4 or 5 days, 1 or 2 cc. of water are sufficient, even for the strongest doses.

### COMPLICATIONS OF GONORRHOEA

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Intramuscular (or subcutaneous) injections of 18 to 30 centigrammes, once daily for 4 or 5 days, may also be administered.

**Other indications** Recurrent fever—Vincent's Angina—Malaria—Sleeping sickness.

**For doses** — see *December Issue of the Canadian Medical Association Journal*, page 943.

Samples and Literature;

**EDDÉ**, New Birks Bldg., Montreal.

No. 1. of January, 1921. It deals with disturbances of the thymus, pineal, thyroid, suprarenal, pituitary, and the gonads, and with the inter-relations of these glands. Not in any way comprehensive, it gives in very readable form a succinct account of these organs and their internal secretions from the point of view of clinical medicine. J. H. E.

**Diseases of the Skin.** By Richard L. Sutton, M.D., LL.D., Professor of Diseases of the Skin, University of Kansas School of Medicine. 1214 pages, 1069 illustrations, and 1100 plates. Fifth edition, revised and enlarged. Price \$10.00. Published by C. V. Mosby Company, St. Louis.

This excellent work has now reached the fifth edition. Sutton keeps abreast of the times and in his work gives the results of the very latest investigations in dermatology. There is no better book for students than this one. D. K. S.

**Treatment of Common Female Ailments.**—By Frederick John McCann, M.D., M.R.C.P., F.R.C.S. 150 pages. Published by Edward Arnold & Co., London.

This small book is intended as stated in the author's preface, "to serve as a guide to the practitioner in the treatment of those common female ailments encountered in the course of an ordinary practice." As such, it is concise and practical, and should afford a means of ready reference regarding everyday problems. For the most part the author has adhered to his purpose, though unfortunately he could not refrain from introducing his own particular method of operating for backward displacement of the uterus, a condition for which operation should seldom be undertaken by a man who is doing "an ordinary practice" and who may not be thoroughly familiar with the many bad operations and few good ones for the surgical relief of this disordered state of pelvic mechanics. F. W. M.

**Neoplastic Diseases, A Treatise on Tumors.** 1000 pages, by James Ewing, A.M., M.D., Sc.D. Professor of Pathology at Cornell University. Published by W. B. Saunders Company, Philadelphia and London.

This book, which is of considerable magnitude and admirably produced, furnishes ample material for guidance in an intensive study of neoplastic diseases. It is exhaustive and illuminating. Its illustrations are of the highest order and provide one of the best available collections of photomicrographs ever published. As a work of reference, its contents are invaluable. F. W. M.

**Gynaecology.**—By William P. Graves, M.D. Third edition thoroughly revised. 936 pages with 388 half-tone and pen engravings and 146 microscopic drawings, 103 illustrations being in colours. Price \$9.00 net. Published by W. B. Saunders Company, 1923. Canadian Agents, J. F. Hartz Co., Toronto.

This book is distinctly a credit to its author and, likewise, to the publishers. In devoting the first one-fifth of the book to the physiology of the pelvic organs and the relationship of gynaecology to the general organism, the author supplies much useful groundwork for the superstructure, comprising symptoms, diagnosis and treatment, and also emphasizes the great importance of not devoting entire attention to the gynaecological phase without an investigation and understanding of the patient's general condition so that proper correlation may result. In the second part, diseased conditions which are met with in the course of practice are dealt with in a clear and practical manner. The third part of the book is descriptive of operative procedures, and it is here particularly that

the illustrations are of such a splendid character and so illuminating, although throughout the book the illustrations are most creditable. This is one of the best books bearing the title "Gynaecology." F. W. M.

**A Treatise on Orthopaedic Surgery.**—By Royal Whitman, M.D., M.R.C.S., F.A.C.S., Surgeon to the Hospital for Ruptured and Crippled, Consulting Orthopaedic Surgeon to the Hospital of St. John's Guild, New York City. Seventh edition, thoroughly revised. Large octavo, 993 pages, illustrated with 377 engravings. Price \$9.00. Lea & Febiger, Philadelphia and New York, 1923.

This well known and justly popular work has now reached its seventh edition, and it may at once be said that this well known author has succeeded in incorporating everything new that is of merit, while at the same time he has maintained the trend toward conservatism, at least so far as open operations are concerned, for which he has always been noted.

In the preface he remarks that "Orthopaedic Surgery is concerned with bodily mechanics, with the prevention and correction of deformity and with the conservation of the locomotive function," thus adopting a somewhat narrower field than some authors, who tend to include everything connected with the function of motion.

As is to be expected, in the treatment of the tubercular affections of the various joints great stress is laid on the various forms of splints, braces and plaster of Paris casts; in our opinion insufficient credit is given to certain operative measures such for instance as those of Albee.

The chapter on the abduction treatment of fracture of the neck of the femur is an excellent exposition of the author's methods and opinions.

The volume is well printed, excellently illustrated, and constitutes an exceedingly valuable and authoritative contribution to the subject. E. R. S.

**Diagnosis and Treatment of Acute Abdominal Diseases,** including Abdominal Injuries and the Complications of External Hernia. By Joseph E. Adams, M.B., M.S. Lond., F.R.C.S. Eng., Surgeon to St. Thomas' Hospital; Senior Surgeon, East London Hospital for Children. Octavo pp. 558, illustrated. Price \$5.00 net. Second edition. Toronto, J. F. Hartz Co., Limited, 1923.

While this volume is published under the above title reference will be found to almost every abdominal disease from acute yellow atrophy of the liver to dysmenorrhoea. The text is rather verbose, and full of repetitions and contradictions. The classifications of the various diseases are as a rule complicated, and based neither on a clinical nor a pathological basis, but often on a conglomerate mixture of the two, which would be extremely confusing to the junior student and useless to the advanced practitioner.

The extended chapters on appendicitis reveal a mid-Victorian attitude in which "peri-typhlitis" is described at length, and abscess due to appendicitis is drained, with the removal of the appendix left for a secondary operation. The main symptoms of appendicitis are given as abdominal pain, vomiting and fever, with the added information that at the onset the temperature often rises to 103 or 104 deg. F.

A few case histories are given. One presuming to describe "acute peri-colitis" says that the peritoneal cavity was opened and a large dark mass which proved to be the caecum and ascending colon was identified. The caecum could not be displaced and the appendix was not seen.

Altogether one can hardly recommend the book to the general reader. E. R. S.



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## Books Received

- Thyroid and Thymus**—By Andre Crotti, M.D., F.A.C.S., LL.D. Second edition. 105 illustrations and 39 plates in colours; 774 pages. Published by Lea & Febiger, Philadelphia and New York, U.S.A.
- The Insulin Treatment of Diabetes Mellitus**—By P. J. Cammidge. 172 pages, illustrated. Published by E. & S. Livingstone, 16 and 17 Teviot Place, Edinburgh. Toronto Agents—McAinsh & Company, Limited, 4-12 College Street.
- Intravenous Therapy**—By Walton Forrest Dutton, M.D. Illustrated with 59 half-tone and line engravings. Price \$5.50. Published by F. A. Davis Company, Philadelphia, Pa.
- An Introduction to the Study of Secretion**—By Swale Vincent, LL.D., D.Sc., M.D., F.R.S. (Ed.), F.R.S. (Can.), M.R.C.S., L.R.C.P., F.Z.S. 168 pages, illustrated. Price 10s 6d net. Published by Messrs. Edward Arnold & Co., London, England.
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